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SUCTION TREATMENT FOR UNDESCENDED TESTICLES

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FOR fifteen years we have employed a glass cylinder connected to a vacuum pump in the treatment of the penis when subnormal in size and for testicles when undescended. The purpose of this paper is to make a preliminary report of the results. A number of times before we have desired

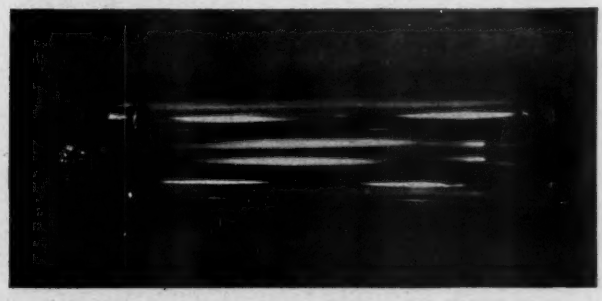

FIG. 1. Glass cylinder used to give vacuum treatments to penis and testes.

to publish our experiences and ideas concerning this procedure, but until recently the series of cases did not seem sufficiently large to prove the value of this method of treatment. Also several things had not been anticipated which were ob-

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served after the administration of the suction treatment to the penis and testicles of boys, and until these phenomena occurred with considerable regularity we were not convinced that the treatment had played a part in their occurrence.

The treatments were at first given to develop penises which were subnormal in size. Owing to the small size of the penises it was necessary to include the scrotum and testicles in the vacuum cylinders, as well as the penis, in applying the treatment. It was soon observed that boys near puberty developed masculine characteristics rapidly after these vacuum

FIG. 2. Suction treatments of penis and scrotum.

treatments; the change from puberty to manhood often seemed hastened.

In the course of time, while we were experimenting with this procedure, a boy 13 years of age came with a very small penis and an undescended testicle on the right side, as well as a testicle smaller than normal on the left. He was given vacuum treatments with the hope that his penis would increase in size. Improvement followed and in addition the undescended testicle gradually came down into the scrotum where it remained and both testicles, in the course of six months, became about normal in size. During this time the boy grew rapidly and puberty changes developed with surprising promptness.

Since this time we have used this suction treatment on all

boys with undescended testicles, as well as those with small penises. In those with underdeveloped penises the treatment has met with varying degrees of success, dependent upon the age of the patient; boys under 10 years of age responded well; those beyond the age of puberty responded less promptly, if at all.

At first we were afraid that the suction treatment might tend to produce inguinal hernia. This, however, has not resulted in either the undescended testicle group or the underdeveloped penis group.

Intra-abdominal testicles are not amenable to this suction treatment as the vacuum cannot pull on the testes. Our ex-

FIG. 3. Suction treatment showing traction on cords thereby loosening and allowing testes to descend into scrotum.

perience with this type has been limited to three cases. In one the treatment was not satisfactory and was abandoned. Later the boy developed appendicitis and his surgeon removed a small, undeveloped testicle at the time of appendectomy. We now have two patients in whom even with the vacuum, the undescended testicles cannot be felt. It seems, therefore, that an operation is necessary for them.

We are about to begin treatment on a boy 11 years of age who had an operation three years ago for bilateral undescended testicles. The operation was not successful and the testes have returned into the inguinal canals; by the suction

treatment we believe that within a few months they can be brought down permanently into the scrotum.

The patients with small penises usually showed improvement in a few months when improvement occurred. As previously stated, our first idea was development of subnormal penises by overdistention of the corpora cavernosa; we had not anticipated the increase in masculine characteristics. The regularity with which these changes occurred led us later to expect them and to speculate as to how the increase in masculine characteristics was brought about. The best explanation appears to be that the testicular hormone is increased

FIG. 4. Undescended testicle associated with inguinal hernia.

by the hyperemia or trauma incident to the vacuum treatments. Whether this result is due to direct stimulation of the testicular hormone or to indirect stimulation of the pituitary and adrenal glands is problematic. The experiments made by Lower have shown the close functional inter-relationship of the testicle, pituitary and adrenals. The testis is the only one of these glands accessible for treatment such as vacuum, massage, etc., and by such means interesting studies are made possible.

One fat boy, with feminine type figure, small penis and bilateral undescended testicles, lost eight pounds under this treatment in six weeks without dieting or medication.

As regards the descent of undescended testicles into the scrotum, the process appears to be due to stimulation of testicular hormone as well as to the mechanical loosening of the cords. Glandular extracts have been administered when indicated, and during the past year we have used antuitrin-S at times in conjunction with the vacuum treatments. The suction and repeated traction on the testicle lengthens and loosens the cord and thereby ultimately permits the testicle to remain in the normal position in the scrotum. In no instance has atrophy of the testicle occurred, although, when the treatment was begun, many were subnormal in size. So far we

FIG. 5. Method of application of suction treatments when complicated with hernia.

have had two boys with hernia as a complicating factor, but this did not interfere with the suction treatment. The hernia was easily held back until the testicle was engaged in the cylinder and then showed no tendency to come down.

Age to Apply Vacuum Treatment.—The treatment should be started at about 5 or 6 years of age, or as soon as the boys become tractable. Many have been older and obtained good results, but the best results were obtained, both with underdeveloped penises and undescended testes, when treatment was begun early, at least several years before puberty.

Frequency and Duration of the Treatment.—Vacuum treatments, either for the small penises or undescended testes, were

given two or three times a week and continued until the results were satisfactory. This required from two months in easy cases, to six months or more in those which were difficult.

Apparatus.—The equipment needed for the vacuum treatment may be made of the ordinary glass cylinder used as a penis developer; the cylinder has a pump attached to it, this is removed and a two-way valve substituted. The valve is for connection to a water faucet pump by rubber tubing.

Running water produces negative pressure in the cylinder. The suction is maintained or released as required by turning the two-way stop cock. If preferred, a one-way connection

FIG. 6. Genital under-development.
FIG. 7. Same patient one year after vacuum treatments were begun.

may be used and the suction regulated by closing or opening a small hole in the end of the cylinder.

Technic of Applying the Vacuum Treatments.—The penis and the pubic region are lubricated with soap and the vacuum then applied so as to draw the penis, scrotum and surrounding tissues into the cylinder. Treatments are given at first with low vacuum and only for three or four minutes until the patient has become accustomed to them; later traction and more suction is applied and over a period of five or six minutes or longer, with traction on the cylinder gradually increased as tolerance is acquired.

Results.—By this method we now have treated fifty-five patients; twenty-nine for under-developed penises and twenty-six for undescended testicles. Of the group of twenty-six with undescended testicles, eighteen, or about 70 per cent,

also had under-developed penises. The cryptorchidism was unilateral in nine and bilateral in seventeen. The testes were subnormal in size in more than half of the undescended ones and in nearly all with under-developed penises. Of the 26 cases of undescended testicle, the results were entirely satisfactory in 23. In three the treatment was discontinued. (1) On account of business, the patient's family moved to another city. The treatment of this case will be resumed within a year or so when the parents return. (2) One boy developed appendicitis and, as previously stated, his surgeon decided to remove the testicle at the time of appendectomy. (3) Another boy had an atrophied testicle following an operation elsewhere. This very small testicle was normal in position and suction treatments were given for a while with the hope that it might be stimulated to regain at least part of its former size. This, however, did not occur. Two boys not included in this group have intrapelvic testicles which cannot be brought into the inguinal canal by suction. An operation will be required for them. In case the cords are found to be too short for a good operative result, a satisfactory outcome should be obtained if the testicles can be placed in the inguinal rings so that the suction treatment can be employed subsequently.

At meetings where pictures have been shown to demonstrate the success of operative correction of undescended testes, a large number of the boys have been shown with tragically small penises. For boys, therefore, with infantile penises and for those who have a tendency toward feminine characteristics, the suction treatment is far superior to operative measures, except for the testes which are distinctly intra-abdominal. Even in these which require, or have had, an operation, postoperative care should include sufficient glandular therapy and suction treatment to bring the penises and testes to a reasonably normal size.

SUMMARY

Suction treatment has been found to be of distinct value in the treatment of penises subnormal in size; it also loosens and lengthens the cord so that undescended testes may be brought into normal position in the scrotum.

In twenty-three patients with undescended testes we obtained excellent results by the suction treatment.

The results have been better than those which usually follow operative measures; in no case did atrophy occur. In fact, just the reverse was observed, namely—the testicles were increased in size by the suction treatment when the suction was begun before puberty. Penises subnormal in size invariably became essentially normal in size as the vacuum treatment (which included the penis as well as testicles) progressed.

Puberty changes appeared to be hastened by this procedure and feminine characteristics disappeared even in boys younger than the age of puberty.

A striking advantage the suction treatment has over operative procedures is that the testicles are not only brought down permanently but the genitals are made more normal in size.

This treatment is not applicable when the testes are intra-abdominal.

PREDICTING THE TYPE OF PERITONITIS WHICH WILL DEVELOP FROM A GIVEN CASE OF APPENDICITIS

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IN practical surgery it is necessary to predict the type of peritonitis which will develop following any given exciting cause. This is necessary in order to formulate our treatment of the lesion and to anticipate events following operation. Conversely given a type of peritonitis we must visualize the type of lesion causing it. Otherwise the essential factor may be overlooked.

We diagnose an affection of an organ and at operation we find it inflamed. If the associated peritonitis does not correspond to the degree of involvement of the organ we must search for some lesion which is capable of producing the degree of peritonitis which the surgeon has before him. It is common to find the surgeon attacking organs the disease of which is wholly incapable of producing the degree of peritonitis present.

Conversely one may operate on the diagnosis of a general abdominal disaster, an acute abdomen as clinical parlance expresses it. At exploration a peritonitis is found and it is necessary for the surgeon to find a lesion capable of producing the degree of inflammation of the peritoneum which is present.

Since affections of the appendix are the most common cause of peritonitis this organ may well be selected as the example of the relation of cause and effect. The commonest error is to remove this organ when obviously the changes it presents are insufficient to explain the degree of associated peritonitis.

Though neither the affections of the appendix nor the peritonitides admit of exact classification, because one degree gradually merges into another, one is able to group them with sufficient accuracy for clinical purposes.

For the purpose of this discussion we may classify the ap-

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pendix form and the type of peritonitis it will engender as follows:

Nonsuppurative appendicitis.	Hyperemia of the peritoneum.
Suppurative appendicitis.	Localized peritonitis.
Necrotic appendicitis.	Spreading peritonitis.
Gangrenous appendicitis.	Diffuse peritonitis.

Nonsuppurative appendicitis may be made to include those cases in which there is simple inflammation of the organ confined chiefly to the mucosa with little or no involvement of the peritoneum. This form of appendicitis is commonly called catarrhal, a term incorrectly used because it implies that increased exudation of the mucosa is the chief disturbance when in fact the lesion is a lymphadenitis, a tonsillitis of the appendix as it were. The organ is made more dense by the inflammation which causes it to appear somewhat enlarged on inspection but the essential change is manifest to the touch rather than to the sight. The covering peritoneum is hyperemic but this may well be caused from inflammation of an adjacent organ but if the hyperemia is secondary the appendix is not more dense than normal when palpated.

The essential fact to be emphasized here is that there is only hyperemia of the covering peritoneum of the appendix without sufficient reaction to excite adjacent peritoneal surfaces. The whole disturbance is played within the organ itself. When the organ is removed the whole disease is removed.

This type of appendicitis finds its prototype in acute hyperemia of the peritoneum such as one sees after slight local irritation or as the borderland of some more pronounced reaction elsewhere.

Suppurative appendicitis is that type which involves the entire wall of the appendix including the peritoneum but does not destroy its walls. The wall of the appendix is inflamed but not perforated and while pus organisms may escape there is no gross lesion permitting the escape of gut contents. An exudate is formed on the surface of the appendix which produces fibrin. This fibrin excites adjacent peritoneal surfaces, particularly the omentum, to reaction.

The adjacent peritoneal surfaces unite to the appendix to form a definite wall about it, localizing the inflammation. This is a localized inflammation, hence a localized peritonitis. Even if the degree of involvement of the wall of the appendix is great enough to permit bacteria to escape, and a purulent exudate forms about it, the reactive process in the walls of the adjacent surfaces are in a sufficiently active state that the escaped pus will be walled in. In such cases the wall of the appendix is approaching necrosis but it is walled in. Should the wall formed by the omentum be broken, a spreading infection would result. We speak then of a localized appendicitis meaning thereby that the diseased appendix has been walled in by adhesions and the reaction on the part of the peritoneum is confined to the region of the appendix.

Viewed at operation there is little or no free pus. If the source of the infection is removed the adjacent peritoneal surfaces will wall in the infection that has already escaped, if any, and the disease is controlled. If an abscess is formed, it is a walled-in one.

In this type the removal of the appendix may so completely remove the offending mass that closure of the incision without drainage is permissible. Nothing but bacteria remain and the peritoneum has great power to combat simple bacterial invasion. Most of these patients recover, without operation as a matter of fact, the infection being confined and absorbed and the inflammation of the walls heals.

It is essential to note that while the appendix may be walled in, it may not be possible to remove the wall together with the infection. This is true when a gut forms a part of the retaining wall. If this retaining wall is ruptured the localized peritonitis is converted into a spreading one.

The essential feature in this type is that there is an anticipatory reaction about the site of disease sufficient to combat the infection at the beginning. If the abscess is broken into the seriousness depends on whether adjacent peritoneum is still in a state of reaction or has returned to normal. If the former a spreading peritonitis results, if the latter a diffuse.

In necrotic appendicitis on the other hand there is a solution of continuity of the walls of the organ and not only bacteria escape but also intestinal contents. This condition is

brought about because the changes in the wall of the appendix are such that adhesions do not form or if they form they are released again because the toxins of the infection destroy the fibrin of the recently formed adhesions.

The wall of the appendix is completely destroyed at some point and the escape of intestinal contents adds greatly to the seriousness of the infection. Experiments in dogs have shown that even sterilized intestinal contents greatly aggravate the seriousness of an infection. The seriousness in any particular case depends on the rapidity with which the fecal contents escape beyond the wall of the appendix. If the wall of the appendix reacts to inflammation before the wall breaks down, the inflammation of the adjacent peritoneum is such as in a measure to prepare to combat the escaped contents of the appendix. One sees this when in the course of an acute inflammation the wall of the appendix gives way, say about the fourth or fifth day. During this interval the adjacent peritoneum has had time to prepare for the coming escape of gut contents. There are associated clinical signs in the region of the appendix indicating intense reaction and if these increase one may know that rupture has occurred and the incision may be so made as to enable the surgeon to meet the more serious lesion. The split muscle incision and the hooking up of the appendix with the finger has no place in this condition because this maneuver is sure to spread the infectious material.

Much more serious is the condition when there is little reaction in the wall of the appendix before it gives way. Necrosis of the wall of the appendix from pressure of a fecolith furnishes the classic example of this form. The wall is destroyed by pressure and there is but little reaction in the adjacent areas of the appendix. The adjacent peritoneum consequently is not put in a state of reaction sufficient to enable it to wall in the infection. Because of the lack of reaction on the part of the appendix the adjacent peritoneum likewise is not set in notable reaction and the infection spreads. In other words we have a spreading peritonitis from the beginning. The seriousness of the condition depends on the degree of the reaction of the adjacent peritoneum particularly of the omentum.

The spreading infection is in a varying measure combated

by the reaction of the adjacent peritoneum which may succeed in converting the spreading form into a localized form. On the other hand the reaction may not be sufficient to wall in the appendix secondarily and the disease spreads. As a rule when a fecolith has caused the solution of continuity of the wall of the appendix, largely by pressure necrosis, the infection is likely to continue to spread and the spreading peritonitis becomes essentially diffuse and the patient dies unless the surgeon is able to combat it by removing the offending organ and aid in combating the spread. In patients beyond midlife and in children the escape of fecal contents usually results fatally. The appendix at this time of life does not form as pronounced a reaction as it does in midlife.

It is the anticipation of this type that makes early operation for appendicitis so imperative, the older the patient the greater the need. At best, gut contents having escaped from the appendix, the removal of the appendix does not remove all the trouble. No amount of care in toilet of the peritoneal cavity will insure the removal of all the fecal material. It is a mistake to allow the peritoneum to do the best it can at localization of the infection. A gauze drain should be inserted in order to aid in the removal of as much of the infected material as possible but chiefly to aid in walling in the infected area. A gauze drain, by its irritant action on the surrounding peritoneum, excites it to renewed exudation and stimulates to the formation of adhesions. By causing some of the infected material to escape from the wound and by furthering the formation of adhesions in order to wall in the infection that remains the surgeon does all he can to enable the patient successfully to combat his disease. If an abundant purulent exudate has already formed, particularly in the pelvis, the addition of a rubber drain into the dependent part is indicated.

It may be remarked in passing that the use of the gauze so-called drain is a lost art. In the early days when most of our appendix operations were late we had to know how to halt a spreading peritonitis. It is in this form particularly that the disease may be older than the symptoms. This is particularly true in pressure necrosis from a fecolith. The symptoms may have begun only yesterday but at operation one is confronted with an appendix wall which has already

given way or does so as we begin our manipulation. Our procedure here must recognize the fact that the disease is four or five days old and we must proceed accordingly.

The adjacent coils of intestine may give evidence of an anticipatory reaction. If such is present the chances of a protecting walling in are good. If on the other hand there is a hemorrhagic exudate the outlook is more gloomy.

The most serious type of appendiceal involvement is the *necrotic*. When the appendiceal artery, it being an end artery, is occluded, a part or all of the appendix dies, depending on the site of the vascular occlusion. After a severe initial attack, the pain ceases and the patient is in a state of relative well-being. Dead tissue causes no pain hence after the severe response of the dying nerves there is no further pain. Not only does the dead organ cause no further pain but it is not excited to inflammation and the adjacent peritoneum is not irritated to reaction. The dead organ hangs silently pendent from the cecum. After about four days the living part of the appendix separates itself from the dead part. Suddenly the necrotic part is cast off and the lumen of the appendix is free to spew its contents into the free peritoneal cavity.

Because dead tissue does not excite to reaction, not only are no adhesions formed about the diseased organ but there is no increase in the circulation, no migration of the omentum, no exudate. The peritoneum adjacent to the appendix is wholly unprepared to meet the infection poured out. The condition is like that after the perforation of an ulcer in other parts of the gut tract. The infected material pours unhindered into the free peritoneal cavity. A diffuse or fulminating peritonitis is the result. The peritoneum is a huge culture medium ready to receive the culture that pours from the appendix lumen. The escape of infection continues and will continue until a surgical procedure interrupts it. Therefore the very earliest stopping of the source of infection is imperative.

Thus assaulted the peritoneum behaves variously. A slight reaction may be developed and there may be a feeble attempt at walling in but it is ineffectual and the infection spreads unhindered. Instead of reaction the peritoneum may be pale, the gut wall transparent, the gut dilated. In the severest

form the omentum instead of proceeding to the site of infection retracts along the transverse colon abandoning completely all proffer of aid. These are all evidences of an impending fatal issue.

This type of peritonitis is that seen after perforation of any hollow organ, most commonly a perforating duodenal ulcer. In all the etiologic factor is infection poured into the free peritoneal cavity when it is unprepared by previous inflammatory reaction to receive it.

Conversely if one sees this form of peritonitis when he inspects the peritoneal cavity the surgeon knows he must find a hole out of which infection has escaped. If he fails to find the cause the error is fatal.

Not only must the offending leak be stopped but since as soon as the infection escaped into the free peritoneal cavity an exudate began to form, an exudate ineffectual in so far as combating inflammation goes, as much as possible of this exudate must be removed by drain. Free fluid is best drained by a tube. Therefore in addition to the gauze drain designed to aid in the formation of adhesions a tube in addition must be employed.

Here the prognosis is dependent less on skill than on the time the perforation occurred. Minutes count.

In summary, the organ disease declares the type of peritoneal involvement which will follow and conversely given a peritonitis we must find an etiologic factor commensurate with the peritoneal lesion.

LYMPHOGRANULOMA INGUINALE

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LYMPHOGRANULOMA inguinale has been termed the "fourth venereal disease" because it is thought to be transmitted by sexual intercourse. In the sixteenth century Lopez de Gomara wrote concerning the armies in the New World: "The inhabitants of the 'Isla Espanola' all suffer from 'Bubas,' and as the Spaniards held sexual intercourse with Indian women, very soon they swelled with 'Bubas,' a very contagious disease that produces intense pain. Ailing and not curing, many of them returned to Spain."[1] Coutts[2] has noted many references to lymphogranuloma in the writings dealing with the discoveries of the New World. He states: "From the descriptions of the writers of the fifteenth and sixteenth centuries of the different diseases transmitted to Europeans through sexual intercourse with Indian women of the New World, we arrive at the definite conclusion that not only did they acquire syphilis but also yaws, leishmaniasis, soft chancre, as well as lymphogranulomatosis. The natural confusion arising at the time is easily explained, owing to the total absence of bacteriologic knowledge. Nevertheless, we find such marvelous and detailed descriptions of symptoms, that with our present knowledge of these diseases differentiation is easy."

Tropical or climatic bubo was described by Wendt[3] in 1816, but it was not until 1913 that Durand, Nicholas and Favre[4] recognized lymphogranuloma as a clinical entity. Frei,[5] in 1925, made a valuable contribution to the recognition of the disease when he developed a specific antigen which is now being used for both diagnostic and therapeutic purposes. The condition has only recently become prominent in the medical literature of America. In the recent text books on urology, gynecology and proctology to which I have had access, I have found but scanty reference to it. The first cases of lymphogranuloma inguinale to be recorded in an American journal were reported in 1924 by George H. Hansmann,[6]

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Professor of Pathology of Georgetown University, under the title, "Non-Tuberculous Granulomatous Lymphadenitis." In the study of his four cases, he concluded that he was dealing with a new condition.

Etiology

That lymphogranulomatosis is due to a filterable virus and that it is contracted by sexual intercourse, there is considerable evidence but no definite proof. Repeated bacteriologic examination of material taken from what are apparently initial lesions as well as from definite secondary manifestations have yielded no positive results. Freund and Reis[8] and Meyer, Rosenfeld and Anders[9] have, however, been able to reproduce the disease experimentally in guineapigs and rabbits. Levaditi, Ravaut, Lepine and Schoen[10] and Anders[11] have observed typical macroscopic and microscopic changes in the lymph nodes and the brains of animals experimentally infected with the virus. Coutts, Herrera and Perroni[2] have produced enlargements in inguinal and lumbar lymph nodes of guineapigs by the subcutaneous injection of material taken from lymphogranulomatosis in human subjects. These observers have also obtained a positive Frei test in a majority of the animals which had received the injections.

The mode by which the virus is transmitted is equally uncertain, although it is generally supposed to be by sexual intercourse, normal or abnormal. Initial lesions have been observed on the external genital organs of the male, usually from six to thirty days after intercourse. Initial lesions have not been demonstrated in the female. It should be remembered, however, that chancre and chancroid are also more frequently demonstrated in the male. This has been explained on the grounds that the female genital tract can harbor pathogenic organisms in a latent state (probably due to variations in hydrogen ion concentration), which when transferred to optimal conditions recover their virulence and cause disease. Coutts,[2, 12] writing from Santiago, Chile, contends that lymphogranulomatosis is of buccal origin and he cites numerous cases of his own and other authors to support his contention. He states: "We have sufficient evidence to sustain this theory and also to declare that the increase in the number of cases of this disease is due in our opinion, to the greater frequency

with which coitus buccalis and cunnilinguism is practiced at present, owing to circumstances directly related to the restrictions in childbirth, fear of fecundation or venereal contagion."[2]

Symptoms and Diagnosis

As our knowledge of lymphogranuloma has accumulated it has become more apparent that several seemingly unassociated diseases are due to the same infectious virus; that is, inguinal adenitis (mostly in the male), elephantiasis of the scrotum, elephantiasis of the vulva (esthiomene) and rectal stricture. The disease, therefore, presents varying clinical pictures. In the male the lymph glands in the inguinal and subinguinal regions are most commonly affected. At times a history of an initial sore on the glans penis or prepuce can be elicited, but usually not. The glandular enlargement may be unilateral or bilateral. In from 20 to 30 per cent of the cases the involved glands regress without the formation of pus. The enlarged glands may slowly break down and form multiple sinuses which may drain for months. If the suppuration is complete or if the glands are removed surgically, elephantiasis of the scrotum or penis is a possible sequela. The condition may gradually improve and the patient be left with no recognizable disability, or it may progress to the malignant type which results in a high mortality. Generalized adenopathy involving mesenteric and mediastinal lymph nodes and even the spleen and other internal organs has been described. This condition is rare and is seen only in an occasional case of the malignant type. Constitutional symptoms seem to accompany lymphogranuloma more frequently in the male than in the female. There is often malaise and fever. The temperature varies between 102° and 104° F., and often remains elevated for several weeks, during which time successive glands become involved. It is doubtful if a re-inoculation is possible, and this supposition is strengthened by the fact that the Frei test remains positive for many years.

In the female the disease runs a different course, and generally the first and only symptom complained of is constipation alternating with diarrhea. Examination of the rectum may show granulomatous areas in the peri-anal region with multiple fistulas leading into the rectum. This finding is not

as constant, however, as is the anal stricture which is found in the anorectal region within easy reach of the finger. Ruge[13] found the stricture within from 3 to 6 cm. of the anus in 37 out of 63 cases. Involvement of the sigmoid has been reported. It occurred in one instance among the twelve cases of the present series. Patients with rectal stricture suffer greatly and often develop almost complete obstruction before they appear for medical aid. The condition is much more frequent in the colored than in the white race. Elephantiasis of the vulva in the female, which corresponds to elephantiasis of the scrotum in the male, occurs in a certain number of cases in which the afferent lymph vessels have been blocked secondarily to an involvement of the glands they supply. Jersild[14] thought that there was a definite relation between elephantiasis of the vulva (esthiomene) and rectal stricture, and he reported that he had found the two conditions associated in from 60 to 70 per cent of his cases. He used the term *elephantiasis genito-ano-rectale,* which has been called the "Jersild syndrome."

Barthyles and Biberstein[15] have made a study of the course of the lymphatics in the male and the female and have shown anatomically that an infection of the external genitals of the male would result in an involvement of the inguinal glands, whereas in the female an infection of the genitals would not normally affect the inguinal glands but would instead involve the anorectal gland of Garota. This anatomic difference in the pathways of the lymphatics in the two sexes gives a reasonable explanation of the fact that the same disease can give such varied clinical pictures.

A differential diagnosis of lymphogranuloma inguinale from syphilis, gonorrhea, tuberculosis, actinomyosis and chancroids is necessary. All of these infections may involve the lymphatic glands and histologically may be difficult to differentiate, especially if the glands are broken down. Syphilis and gonorrhea have each been thought at different times and by different authors to be the principal cause of stricture of the rectum. Schede,[16] in 1895, reviewed 18,780 cases of syphilis and found among them only 16 cases of stricture. Among 17,810 men who had been treated for syphilis no strictures were observed. The Wassermann reaction gives a means of excluding syphilis, but it must be remembered that

two or more venereal diseases can exist at the same time and that it is possible that lymphogranulomatosis will give a partial reaction in the early stages. After the assumption that rectal strictures were caused by syphilis had been more or less disproved, they were attributed by many workers to a secondary gonorrheal infection. Rectal strictures are often found to accompany or follow pelvic inflammatory conditions. This association was noted by Poelchen[17] and later by Hayes[18]. Poelchen[17] also pointed out that sodomy was an important factor in producing rectal stricture. Friedel[19] reported that in a series of twelve patients with rectal stricture nine admitted that they had practiced sodomy. Gonorrheal proctitis has been variously reported to occur in from 10 to 75 per cent of the cases of rectal stricture, but definite proof of its being the forerunner of stricture is not convincing. Stuhmer[20] accidentally infected twenty-six men with gonorrhea by using a contaminated glove in prostatic massage. All developed acute gonorrheal proctitis which cleared up in about ten days without any ill effects. Baer's[21] experience also shows the improbability of gonorrhea being the causative agent. In 163 cases of rectal gonorrhea he found only one stricture. The experience of these authors and of many others proves almost beyond the shadow of a doubt that neither gonorrhea nor syphilis is the cause of benign stricture of the rectum.

Lymphogranuloma can be differentiated from tuberculosis, actinomycosis and chancroids by means of a carefully taken history, by the absence of other tuberculous manifestations in the patient, by the absence of the ray fungus, by the absence of the hemophilus of Ducrey and by a careful histologic examination. A positive Frei test will give a correct diagnosis in from 85 to 90 per cent of the cases of lymphogranuloma.

Treatment

The treatment of lymphogranuloma has been disappointing, especially so in cases of stricture of the rectum. Most of those who have discussed the condition say little about the treatment of rectal stricture. Lee and Staley[22] stated that they had carried out repeated dilatation of the rectum, but they added the warning that it is impossible to secure satisfactory co-operation from the type of patient who has this disease. Goldsmith[23] reported that two of his patients, treated by dila-

tation, have been kept in comparatively good health for several years. Clemons[24] asserted that by applying finger cots filled with carbon snow to the strictured area the strictures become more easily dilated. Resection of the rectum with colostomy was performed in one case in our clinic with satisfactory results. However, the fixation of the bowel due to perirectal changes makes this procedure hazardous. Colostomy alone, either permanent or temporary, has been performed in cases of rectal stricture, but this seems a high price to pay for relief from an inflammatory stricture that can be reached with the finger. These strictures differ from carcinoma, for which colostomy is usually done, in that the strictures occur in women in the prime of life. In the opinion of Hayes,[18] Martin[26] and Morter,[26] however, colostomy in a majority of cases is not only an advisable but a necessary procedure.

Goia,[27] reporting his results with x-ray treatment of the malignant type of rectal stricture, stated that the average expectancy of life among the untreated patients was seven months; whereas, among those receiving x-ray therapy the survival of the seventeen still living was five years and four months since the onset of symptoms; and of the deceased, two years and three months. Picard[28] has reported good results from the use of diathermy. Wien and Perlstein[29] have used the Frei antigen for therapeutic purposes in 16 cases of lymphogranulomatosis. Their results have been encouraging. Antimony and potassium tartrate given intravenously have been the basis of treatment in most clinics. Bloom[30] advised starting with the intravenous injection, twice weekly, of 2 c.c. of a 1 per cent solution of tartar emetic and increasing the dosage up to 7 c.c.

Twelve cases of stricture of the rectum have been seen in the rectal clinic of Emergency Hospital during the past three years. In all but one case in which a colostomy was performed, the treatment has been digital dilatation of the strictured area with the patient under a general anesthesia. The following four cases are reported to show typical and interesting aspects of the condition and its treatment.

Report of Cases

Case 1.—(E. C.) A colored woman, 47 years of age, was admitted to Emergency Hospital complaining that for the past two or three years she had

had pain in the rectum with constipation and bleeding. She was married and had two children. A general physical examination was essentially negative except for the rectal condition. A digital examination of the rectum showed a stricture within easy reach of the finger. The constriction would not admit the index finger. An x-ray taken following a barium enema showed the entire rectum to be extremely narrow, with the stricture extending upward approximately eight inches and taking a midline course. A Wassermann test of the blood was negative. The patient was operated upon on Oct. 26, 1932, and a permanent colostomy was established on the left side. The general health of the patient remained good. This is one of the first cases of rectal stricture treated at Emergency Hospital. At the present time an effort would be made to dilate the stricture from below instead of resorting to a colostomy.

CASE 2.—(A. S.) A colored woman, 28 years of age, was first seen in the Dispensary on Feb. 13, 1933. She stated that for about a year she had been troubled with constipation alternating with diarrhea. She had had slight vaginal discharge. She was not married but had one child living and well. Physical examination was essentially negative except for the rectal condition. Digital examination of the rectum showed an annular stricture about 4 cm. from the external sphincter. The strictured area admitted a bougie a little larger than a pencil. The patient was admitted to the hospital for operation. A Wassermann test of the blood was negative. An examination of a smear taken from the cervix was negative for gonococcus. A Frei test was positive. With the patient under a general anesthesia, digital dilatation of the stricture was done and a large rectal tube was inserted. This was kept in for two days and was then withdrawn. An enema, on removal of the tube, gave good results. The patient was discharged on the third postoperative day. She was advised to take two warm enemas daily to be retained for 15 to 20 minutes, and to return to the Dispensary each week for dilatation with a bougie. She returned for dilatation, however, only about once a month. A second digital dilatation, with the patient under a general anesthesia, was carried out about a year subsequent to the first one. The patient has, up to the present time, been dilated with bougies in the Dispensary on more than forty occasions. A No. 3 bougie can be passed without much discomfort. She has been working steadily and states that her health is good.

CASE 3.—(G. M.) A colored woman, 29 years of age, who was examined on July 14, 1933, complained that for the past ten years she had had "piles," constipation and a mass on the left side of the abdomen. She had been operated upon ten years previously at which time the appendix and adnexa had been removed. She was married and had no children. A Wassermann test of the blood was negative. Physical examination was essentially negative except for the rectal condition. Examination of the anus and rectum showed external tags and an annular rectal stricture which admitted the tip of the index finger. An x-ray showed a tube-like rectum. With the patient under a general anesthesia, the strictured area was dilated digitally. During the six months following her discharge from the hospital, she continued to return to the clinic at weekly intervals for further treatment, which included dilatation with bougies. During this period she was having normal bowel

movements. On January 12, 1934, bougies, sizes 2, 3 and 4, were introduced, the latter with some difficulty. The patient had considerable pain but after resting awhile she was able to go home. The following morning she was admitted to the emergency room with an acute abdominal condition. An exploratory laparotomy performed immediately showed a generalized peritonitis with a perforation of the bowel at the rectosigmoid junction. The perforation was closed, but the patient died on the following day. Necropsy confirmed the operative diagnosis.

CASE 4.—(M. D.) A colored woman, 39 years of age, was brought to Emergency Hospital in an ambulance on Jan. 18, 1934. She complained of pain in the abdomen and constipation alternating with diarrhea. She stated that she had had bowel trouble for the past eleven years and that the condition had grown worse during the previous three years. As the bowel moved only when the content was fluid, she had to take cathartics constantly. She frequently passed blood. At the time of her admission to the hospital she was suffering from a general toxicity. Examination of the rectum revealed an annular stricture 7 cm. from the anal orifice. The stricture was spongy and bled easily. It did not appear to be malignant. A Wassermann test of the blood was negative. A Frei test was positive. With the patient under a general anesthesia, the stricture was dilated and a large rectal whistle was inserted. The patient was discharged from the hospital on the ninth postoperative day. She returned to the clinic about once a month for dilatation with a bougie. On March 15, 1935, a No. 3 bougie could be introduced without difficulty. The bowels move daily without the use of laxatives. Her general condition is good.

DISCUSSION OF CASES

Our interest has been confined to those cases showing stricture of the rectum, but we feel sure that many more cases of lymphogranuloma have been seen in the outpatient department but have not been recognized or treated. The condition seems to be limited to individuals in the lower walks of life, although I can recollect several patients from the middle strata whom I believe would have given a positive reaction to the specific antigen.

All of the twelve patients having rectal stricture in this series were colored women except one, a white male. Their ages ranged from 18 to 40 years, or in other words during their active sex life. The history in these cases, as might be expected, was very unsatisfactory. All of the patients complained of "piles." On further inquiry they admitted that they had had a change of bowel habits beginning from one month to 17 years previously. The usual history was that there had been a progressively increasing constipation which

required more and more cathartics and resulted in very painful stools. None of our patients admitted having any remembrance of a primary sore, though most of them said that they had had some vaginal discharge at times. The Wassermann was negative in seven cases, positive in three and was not taken in two of the cases. The Frei test was positive in the three cases in which it was taken. Unfortunately we have not been able to keep a supply of the Frei antigen on hand for the sporadic occurrence of cases as they appeared.

In case 1 a permanent colostomy was performed following an exploratory laparotomy. The patient's rectum was almost completely obstructed at the time of operation and the sigmoid showed an involvement as far as the flexure. In 11 cases the treatment was dilatation with the patient under a general anesthesia. There was a marked similarity in the clinical findings of the cases which were dilated. In each case the stricture was within easy reach of the finger, and it was thought that above the stricture the bowel was free. To accomplish the dilatation one finger was first pushed through the strictured area. As the anal canal was usually constricted to the size of a lead pencil or smaller, this initial insertion took considerable force. Two fingers, then three fingers, were pushed through, until the constricted area was dilated to 1½ or 2 inches in diameter. A large rectal bougie was then passed, with great caution, to ascertain if there was any narrowing farther up. There was often considerable bleeding and discharge of fluid bowel content from the sigmoid. A word of warning might not be out of place here. When the stricture extends more than six inches up the rectum, care should be taken in passing bougies. They should be held between the thumb and fingers, as in passing a uterine sound, in order to avoid making too much pressure. Failure to observe this precaution in one case of our series resulted in the bougies being pushed through the bowel at the rectosigmoidal juncture. Peritonitis and death resulted (Case 3).

In our cases we have found that the constricted area gave much more readily to dilatation than it does in cases of carcinoma or of stricture due to scar tissue. When the area was sufficiently dilated, a large well lubricated rectal whistle, 5 inches long and 1½ inches wide, was inserted and left in for two days. During this time the patient was given a generous

allowance of morphine. When the whistle was removed, retention enemas of warm water and witch hazel were given twice daily.

The patients have usually remained in the hospital less than a week, and upon discharge they have been instructed to keep up the enemas and to return to the dispensary for treatments. Dilatation with bougies is carried out once or twice a month or as long as the patient continues to come to the dispensary. Most of the patients come for awhile and then, acquiring a false sense of security, they neglect their treatments and are lost sight of. They constitute such a transient and irresponsible group of society that the social department finds the follow-up in these cases difficult and often impossible.

SUMMARY

1. Lymphogranulomatosis is much more prevalent than it is generally supposed to be.

2. It is a chronic disease and is disabling in its effects.

3. The Frei test should be done on all suspected cases.

4. Rectal strictures are best treated by digital dilatation with the patient under a general anesthesia, followed by the passage of bougies at weekly intervals for an indefinite period.

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THE LINGUAL CHECK VALVE

Observations on Inadequate Treatment of Asphyxia

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A CHECK valve in mechanics is one that permits a flow in one way only. Check valves are fundamental to pumps, including the heart. It is well known that the tongue is obstructive at times during general anesthesia, but it is not generally realized that the tongue dropping into the pharynx of a dorsally recumbent person becomes a *check valve* permitting egress but *not ingress* of air to the lungs. The pharnyx constitutes a funnel leading into the laryngeal orifice. This funnel acts as the valve seat of a check valve when the tongue drops backward and fills the funnel. The tongue is heavy and it has no firm ligamentous or bony support; only muscles hold it in place. In addition to gravity the inward passing air draws the tongue down into its valve seat. Air escapes upward past the tongue when the air current is strong enough to lift the tongue, but as soon as the expiratory phase ends the dropping of the tongue to its valve seat shuts the lingual valve against ingress of air. Bilateral atelectasis and asphyxia will follow in a few minutes if the tongue be not lifted. This is a very common occurrence during deep, normal sleep of everyone. Air hunger, however, quickly awakens us or we would all die in our sleep, that is, those of us who sleep on the back. A dorsally recumbent individual unconscious from any cause that prevents prompt restoration of sub-consciousness to a sufficient degree to activate the lingual lifting musculature will certainly asphyxiate if no aid is given him by drawing the tongue forward, or by turning him on his side so the tongue will fall forward.

The Death Rattle: The terminal phase of almost every death from any cause, when the patient is lying on his back, is asphyxia by the lingual check valve. As the tongue drops backward it is drawn down into the laryngeal valve seat by negative pressure and obstructs more and more effectively the

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ingress of air. When the dying patient reaches the stage at which the tongue cannot be lifted forward and upward by its musculature against the gravity and against the inspiratory current, the closure of the lingual check valve quickly terminates life. The sound of the flapping of the lingual check is often masked by the noise of bubbling secretions.

Asphyxia

The remarks in the preceding paragraph refer to asphyxia incidental to the terminal stage of inevitable death from cause other than asphyxia. When we come to consider asphyxia in patients not incurably moribund from another cause we encounter an appalling state of facts.

It has been estimated that approximately 50,000 deaths occurred in 1933 from asphyxia[1]. Necessarily, figures on this subject can be only approximate because in many cases the asphyxiation is a terminal factor obscured by the major factors, smoke, fumes, electric shock, carbon monoxide or other gas-poisoning, hanging, etc., under which the death is recorded. Moreover, the terminal phase of almost all deaths from any cause whatever is one of asphyxia. For illustrative purposes, however, the figures 50,000 will do as well as half or twice as many.

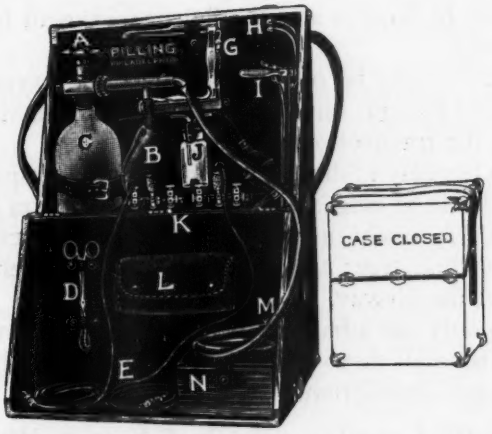
The important point is that of the estimated 50,000 cases in very few, if any, did the patient have the benefit of the best treatment possible in view of our knowledge of today. Asphyxia means death for want of oxygen in the tissues. Beside the man dying of asphyxia there was in most instances neither an oxygen tank nor any method of getting oxygen into the tissues. Moreover, as Yandell Henderson[2] has shown, for resuscitation in cases of impending asphyxia the oxygen should have an admixture of at least 5 per cent of carbon dioxide. A tank with such a mixture was available in even fewer instances, if any.

Treatment of Asphyxia in Hospitals: In the modern, well-equipped hospital with its staff of able physicians, surgeons, and specialists, asphyxia is efficiently treated by gas therapy, intratracheal insufflation, intubation, tracheotomy and all the accessories. Patients developing paralysis of respiration are kept alive by oxygen with carbon dioxide admixture, intro-

duced by direct laryngoscopic placing of the gas-tube, until the basic lesion has been cured, if curable.

Paralysis of respiration in newborn babies narcotized by medication given the mother is treated by keeping the baby alive until the narcotic is eliminated.

Tracheotomy is done to prevent asphyxia from bilateral recurrent paralysis and other forms of laryngeal obstruction. *Bronchial obstruction* in the after-care of tracheotomy is usually recognized and as a consequence many of these patients asphyxiate under an erroneous diagnosis of double pneumonia. The same may be said of *drowning of the patient in his own*



This illustration shows an assembly of standard instruments along with a tank containing oxygen with 5 per cent CO_2 admixture. The assembly obviates loss of time in gathering up the necessary instruments and, moreover, renders the equipment portable. The bronchoscope and aspirating tubes are contained in a metallic sterilizable case so as to be ready for immediate introduction.

secretions. Such patients usually perish without the bronchoscopic aspiration that would have saved the lives at least of those in whom the drowning was not due to a necessarily fatal basic condition.

Treatment of Asphyxia in Accident Wards: Most accident wards are inadequately equipped for efficient treatment of asphyxia. In most instances there is no means of properly dealing with the lingual check valve, and the personnel have not the training to use it if such means are available.

Ambulance Equipment for Treatment of Asphyxia: Investigation shows the appalling fact that very few ambulances are equipped with oxygen tanks, practically none is equipped with tanks of oxygen plus carbon dioxide admixture, and certainly none with adequate means of getting oxygen into the tissues. In the aggregate, hundreds of ambulances go to fires without the vitally necessary equipment for the treatment of impending asphyxia. A few are equipped with deadly mechanisms for artificial respiration.

How Shall We Get Oxygen Into the Tissues?

All the foregoing statements call for constructive suggestions.

What may be done to afford efficient treatment for impending asphyxia?

Some day it may be possible to introduce oxygen directly into the blood stream; but at present the only practical method is through the tracheobronchial tree.

Looking broadly at the subject of impending asphyxia there are three classes of cases: 1, those with obstruction in or above the larynx; 2, cases in which there is obstruction in the tracheobronchial tree; and, 3, cases in which there is no obstruction of the airway.

There is only one adequate method applicable to saving the patient's life in all three classes of case and that is by bronchoscopic oxygen insufflation.

Dealing With the Lingual Check Valve: When the patient is still making respiratory thoracic movements drawing out the tongue is all that is necessary. The anesthetist prefers to raise the tongue by the fingers of both hands applied below the angle of the jaw. Paluel J. Flagg eliminates the lingual obstruction entirely by the direct laryngoscopic insertion of a rubber tube into the trachea, through which the patient does his own breathing until the end of the anesthesia.[5]

In cases of laryngeal obstruction tracheotomy is usually advisable. This procedure, one of the oldest in surgery, is always in order and is never contraindicated. Its indications are the cardinal signs of obstructive laryngeal dyspnea, namely, indrawing at the suprasternal notch and at the epigastrium. It should always be done low. The best way to do it is to in-

sert a bronchoscope first. But I do not come before this great assembly of great surgeons to advocate any such platitude as tracheotomy for obstructive, laryngeal, impending asphyxia. It should go without saying that the intern accompanying every ambulance should be thoroughly trained in the procedure of emergency tracheotomy, however rare the call for it may be. It may be here stated parenthetically that this investigation has revealed the fact that almost no ambulance is equipped with tracheotomic instruments, and moreover, many of the leading hospitals in large cities do not have an ambulance; they depend upon undertakers for ambulance service, and there is no intern at all on such ambulances.

Artificial Respiration: In advocating direct intratracheal insufflation of oxygen (plus 5 per cent carbon dioxide) there is no intention even by implication to lessen confidence in artificial respiration in cases of respiratory arrest from any cause whatever. On the contrary, artificial respiration, especially by the prone-pressure method, should be taught to every high school pupil and every boy and girl scout. There is only one drawback to the prone-pressure method, namely, that the first stroke is expiratory. This will empty the chest and if the lingual check valve is not adequately dealt with the patient will be killed by pumping out of the lungs instead of into them. Therefore, it is vitally necessary to think first of the lingual check valve. A slight addition to the rules would cover this point. In instruction for the prone-pressure method there might well be added: "Be sure the mouth is down close to the arm so the tongue will fall forward; before starting the first compression stroke get a bystander to depress the jaw slightly and see that the tongue remains forward and that the mouth is clear of secretion."

In the Sylvester and Howard methods the patient is on his back, the tongue falls back and becomes a highly efficient check valve whose action will pump air out of the lung and prevent ingress; it will thus promptly kill the patient if the tongue be not drawn forward before the first pressure stroke. Therefore in any instructions for use of these methods it would be well to make the first rule: "Before commencing artificial respiration be sure the tongue is forward; get a bystander to hold it forward with thumb and finger covered with a layer

of handkerchief." If the Howard method is used this can be done with the other hand of the helper who holds down the arms extended over the head. In the days when the Sylvester method was the one of choice it was not uncommon to see air being forced out on the pressure stroke, but absolutely none going in on the inspiratory stroke, though the artificial respiratory movements were being carried on correctly.

The foregoing applies to emergency work in the absence of any material equipment. When it comes to ambulances, accident wards, police and fire stations, first aid stations of all kinds, industrial plants, mines, bathing beaches, wherever artificial respiration is to be used, it may be said that the equipment is deplorably inadequate if it does not include a tank of oxygen with 5 per cent admixture of carbon dioxide. Any layman who is taught artificial respiration can be adequately instructed in a few minutes how to start the flow of gas from the tank and any child could hold the end of the rubber tube close to the mouth and nose of the patient. The most efficient artificial respiration by an expert draws into the lungs probably less than one third of the normal amount of air. It is deplorable to realize that outside of well-equipped hospitals this one-third volume is rarely enriched with oxygen from a tank. Still more rarely is there available oxygen with the vitally necessary admixture of carbon dioxide.

No method of artificial respiration is adapted to patients with fractured ribs or injured spine.

Blind Intubation: Dr. William D. Haggard has made the excellent suggestion that interns be taught catheterization of the trachea by blind methods, as a simpler means than direct laryngoscopic introduction. The best instrument for doing this is, if the oral route be used, the angular tipped coude catheter; if the nasal route is preferred, the nasal anesthetizing catheter is perhaps best.

Direct Laryngoscopic Intubation of the Trachea for Insufflation of Oxygen (plus 5 per cent carbon dioxide): The best of all methods of resuscitation in impending asphyxia is bronchoscopic insufflation. This method was advocated by the author 20 years ago[4], but has been little used except in the bronchoscopic clinic. In the clinic, however, its value has been demonstrated in hundreds of cases. In the purely laryngeal or

high tracheal cases it is followed by tracheotomy; in the cases of bronchial obstruction the obstructive conditions are dealt with by peroral bronchoscopic methods; in the non-obstructive cases an insufflation tube is left in place until the patient can be trusted to do his own breathing. The success in all three classes of case has led us to advocate strongly its general adoption. We feel that every ambulance and every accident ward should be equipped not only with a tank of oxygen with carbon dioxide admixture, but with the few instruments necessary to get the gases into the blood stream on its way to the tissues where its lack is the cause of impending death.

The objection usually raised to the effect that direct laryngoscopic introduction of a bronchoscope or an oxygen insufflation tube is a highly technical procedure learned with great difficulty is an error. It is true that the introduction of an esophagoscope is difficult and dangerous in the hands of the inexperienced; but this is not true of introduction of a bronchoscope or insufflation tube. As to the latter procedures any medical student can be taught and trained to thorough efficiency in about 20 hours. This does not mean that he will be qualified to attempt the solution of a difficult problem of bronchoscopic foreign body extraction; but he can introduce a bronchoscope or insufflation tube, into any patient whose mouth can be opened and with utmost ease into the limp body of a patient whose respiration has ceased. The 20 hours of fundamental training are, however, essential.

CONCLUSIONS

1. Though the tongue as an obstruction to respiration is well known, it is not realized that with an unconscious patient in supine position the tongue becomes a check valve that permits free egress of air, but shuts tightly against ingress of air.

2. If the lingual check valve is not eliminated artificial respiration will kill the patient by pumping air out of the lungs instead of into the lungs.

3. More than 50,000 persons in the United States die annually from asphyxia, and very few, if any, of them receive the best treatment for impending asphyxia.

4. These victims die for want of oxygen in the tissues. Very few ambulances are equipped with a tank of oxygen, still

fewer with a supply of oxygen with admixture of carbon dioxide, and practically none with efficient means of getting the oxygen into the tissues.

5. All emergency ambulances, all accident wards, all bathing beaches, police and fire and first aid stations of all kinds, should be equipped with a tank of oxygen (plus 5 per cent carbon dioxide) and a tongue forceps. All such places having a medical attendant should have, in addition, instruments for direct laryngoscopic clearing of the airway and intratracheal insufflation of the gas mixture, and the attendant should know how to use them.

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THE MANAGEMENT OF THE INCOMPLETELY DESCENDED TESTIS

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BEFORE taking up the immediate question of management I want to draw attention to some points in regard to etiology which may influence our opinion.

ETIOLOGY

I do not propose at this time to enter into any extensive discussion of etiology, since it involves complicated discussions of embryology and is not, as I think, wholly decisive. On the other hand, our opinion in regard to treatment will depend to some extent on whether we believe that the causes of malposition are chiefly due to anatomic errors of development or whether we believe that the underlying cause is to be found in inherent failure of development of the testis itself.

1. *Anatomic changes not involving the testis.*—Practically since the beginning of discussion in regard to the etiology of cryptorchidism much attention has been paid to the role played by the gubernaculum testis. John Hunter laid stress upon this and at a much later period Lockwood discussed it in detail. I desire at this time only to call attention to a few points. In the first place there appears to be complete agreement upon the fact that the gubernaculum contains unstriped muscle fibers. This at least suggests that its purpose is to exercise some control over the ultimate position assumed by the testis. Therefore, we must not lose sight of the role of the gubernaculum, although we may be in doubt as to its precise function. The second point which has too often been overlooked is that the gubernaculum in its lowest, or scrotal attachment, is not attached to the scrotum itself, but is attached to the lower portion of the processus vaginalis and the fascial layer which surrounds it. Hunter[12] has drawn attention to the fact that in the new-born child the testis with its coverings can be drawn out of the scrotum and into the inguinal canal

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without pulling with it the scrotum. This point appears to me to be important, since we have been inclined to think of the lower fibers of the gubernaculum as attached to the scrotum and operating from that as a more or less fixed point. We should abandon this conception and remember that the lower fibers of the gubernaculum follow the developing processus vaginalis, whether it lies in a normal or an abnormal position. Thus when the retained testis is found in its most common position, the so-called interstitial position, that is to say, lying in the inguinal canal, the processus vaginalis is in its normal relation to the testis and the gubernaculum extends from the lower portion of the testis to the lowest portion of the processus vaginalis, known as the tunica vaginalis. This relation holds true when the testis is found in other abnormal anatomic positions, such as the much less common perineal or penile types of displacement. It has been my clinical experience that in all of these malpositions the structures of the gubernaculum are more than normally developed and suggest abnormal shortening or even hypertrophy.

It will be remembered that the gubernaculum is generally described as having three processes or extensions constituting its attachments. The main attachment, as above described, is to the structures of the processus vaginalis or tunica vaginalis. The upper fibers are attached in the region of the spine of the pubis, while the lower fibers extend down into the perineum. There is at least a suggestion that the rarer types of deformity, the perineal and the penile, may be influenced by failure of development or weakness of the strongest central portion.

Finally, it does not seem logical to regard the gubernaculum as playing the controlling part in the descent of the testis, since it can operate to guide the testis downward into its normal position only in so far as the development of the processus vaginalis has taken place to a normal extent. Thus, if the processus vaginalis ends in the inguinal canal, or after the testis has emerged from the external inguinal ring, the gubernaculum is powerless to direct progress beyond this point. This strongly suggests that the development of the testis and the development of the processus vaginalis go hand in hand, and that the failure of one may influence the fate of the other. Clinically there is a very strong suggestion in the patients having the inguinal type of abnormality that the tissues lying be-

low, that is to say, on the scrotal aspect of the lower end of the tunica vaginalis, are abnormally thickened and fibrous. There is often to be found, particularly in the older children, firm fibrous tissue lying directly in the pathway of further downward progress (Figs. 1 and 2).

2. *Failure of development of the testis itself.*—It is at least arguable that failure of descent of the testis, as shown in the cases of abdominal retention or retention at any point along the inguinal canal, is due to some failure of growth of the testis itself. These types of abnormality appear to differ from other types—the perineal and the penile—in which the total distance traversed by the testis is perhaps sufficiently great, but the direction is faulty. In these cases at least the testis emerges from the external inguinal ring and then appears to lose its course. The theory of faulty development is of particular importance in connection with recent suggestions that the administration of an anterior pituitary-like substance may assist the descent of the testis into a normal position. Such a theory must be based upon the assumption that there is failure of development which can be stimulated by the administration of a hormone. On the other hand, if this thesis is faulty, then stimulation of growth of the testis is not likely to be helpful. It might be assumed that there would be clinical evidence of the state of development of the testis derivable from observations at operation undertaken for correction of the deformity. As a matter of fact, the testimony upon this point appears to be contradictory and the clinical evidence is probably at present at least indecisive. We are concerned, of course, only with the evidence concerning the development of the testis found lying in an abnormal position before the advent of puberty. This point is of some importance, since we are now aware that following the changes of puberty the abnormally placed testis will show abnormality due to its position and not warranting the assumption that its condition is congenital. As far as I can gather from clinical evidence and from my own experience, there is no satisfactory evidence that the abnormally placed testis is, before the age of puberty, always abnormal. On the other hand, there is a considerable proportion of these cases in which the testis is obviously smaller than normal, and this is particularly true of the cases in which the retention is of the abdominal type. The abdom-

inally retained testis in my experience has generally, although not always, been smaller than the apparent size of the testis on the other side, if that was in a normal position. Not uncommonly the testis found lying in the inguinal canal of the child is apparently smaller than normal. Opposed to this observation is an important number of cases in which the testis, abnormally placed, is apparently normal in other respects, particularly as to size. As a matter of fact, the only absolutely conclusive evidence on this point would have to be obtained from examinations made at postmortem on suitable occasions, since mere estimates of size are notoriously unreliable, and there is also involved the question of microscopic cellular development. Under this heading, therefore, I think we must admit that there is enough evidence of subnormal development of the retained testis to warrant the continuance of studies of the effect of hormone treatment.

The Management of Cryptorchidism

Coming now to the main problem at issue, it may be proper to ask why we should be so much concerned. The answer is under three headings.

1. Thanks to the work of Moore[14], Engle[7], and others, it has been shown beyond reasonable doubt that the normal development of the testis requires a normal environment, namely, one outside of the body in the lowest portion of the scrotum where it is exposed to a temperature considerably below that of the rest of the body. It may be worth while to repeat, what has been said so often during the last few years, that this effect upon the testis takes place only after the changes of puberty have begun. The experimental evidence does not suggest that retention in an abnormal position is per se objectionable until development begins. If, however, the testis is allowed to remain in an abnormal position after the changes of puberty are well under way, then permanent damage of a greater or less extent is inevitable.

2. *Greater liability to the development of cancer.*—Many statistical studies by various observers in many parts of the world appear to agree that cancer is very much more common in the abnormally placed testis than in its normal brother. The extent of the increased liability has been variously stated

at from fifty to two hundred times as great. The precise figure does not seem important, for if we accept the lesser of fifty to one, the increased danger is serious. It would, of course, be highly desirable if we had at our disposal statistical evidence tending to show whether or not the replacement of the testis in a normal position certainly, or even probably, did away

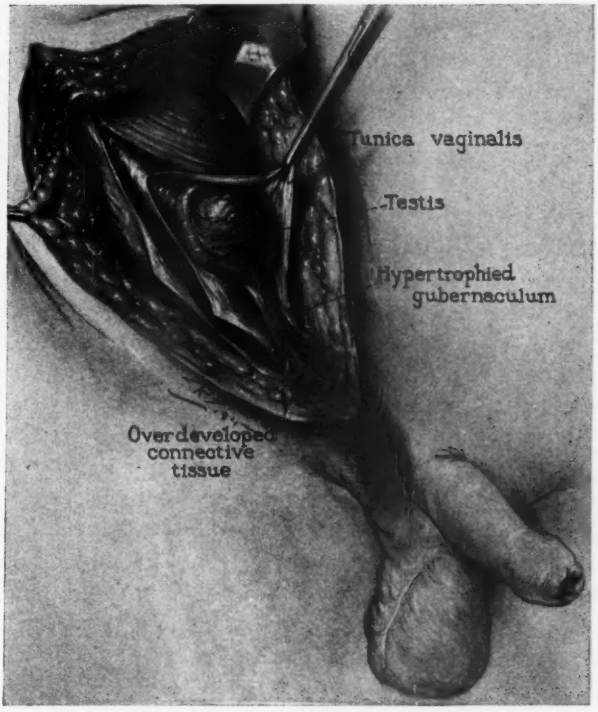

FIG. 1. This drawing illustrates particularly (1) the abnormally large gubernaculum, (2) the fibrous impediment to further advance of the testis, and (3) the undeveloped right side of the scrotum, as revealed at operation.

with this increased danger. On this point, however, I know of no controlling evidence. The number of reported cases in which the testis has been brought down into a normal position and retained there and in which it is known that these people lived their lives without developing cancer is altogether too small to warrant any opinion. It may perhaps be suggested that in so far as the replacement of the testis in a normal position results in its normal development to that extent will it overcome the handicap under which it apparently suffers. As

far as I know, however, this question is a matter of pure speculation.

3. *Infection and injury.*—I have no reason to believe that the abnormally placed testis is more liable to infection than its normally placed brother. On the other hand, acute epididymitis in the abnormally placed testis is more difficult of management than under normal conditions, and if it lie in the inguinal canal in the presence of an open processus vaginalis and potential or actual hernia, then the inflammation is likely to involve structures other than the testis, epididymis, and tunica vaginalis, and may lead to serious consequences. Moreover, it is by no means easy always to distinguish between an epididymitis in an inguinal cryptorchid and a strangulated hernia in its more advanced stages. In fact, the two may coexist, offering a difficult surgical problem.

In regard to trauma I have only clinical evidence to offer. Many adult patients with the inguinal type of deformity have complained to me of soreness and discomfort clearly not due to inflammation, but to the exposed position of the testis.

Of these three reasons for concern over malposition of the testis the first, namely, failure of development, seems to me the most important. With the liability of cancer occupying an ill-defined position and infection and injury constituting a nuisance, if nothing worse, I think that we have a good case for insisting that the testis must by some method or another be brought into its normal relations before the changes of puberty.

Methods of Treatment

We have at our disposal four methods which we may at least entertain.

1. The first may be called that of watchful waiting, a method much employed in the past, but which seems to me respectable only because of its antiquity. The physician who follows this course risks permanent damage to an important organ, and will, I think, be put to it to justify his plan should failure, which will occur in the majority of cases, result.

2. The second method at our disposal is to seek assistance from stimulation of the growth of the genital apparatus by the use of an anterior pituitary-like substance. This work followed upon the observations of Evans[8, 9] and is still in the

experimental stage. Interesting results have been reported by Goldman and Stern,[10] by Aberle and Jenkins,[1] and by Cohn.[5] The reports of these observers would appear to warrant further investigation of the method. In some cases, at least, excellent results have been obtained, although some instances, for example, that of Cohn, in which the testis assumed a normal position within six hours after the first injection, rather test our credulity. Such observations as this suggest

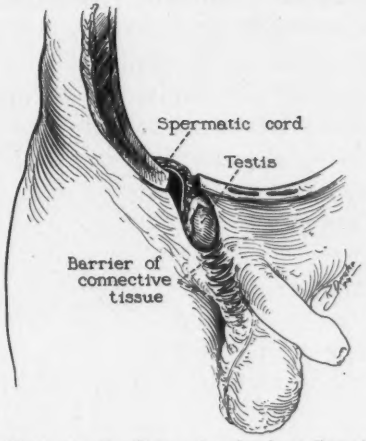

FIG. 2. This drawing illustrates the fibrous barrier impeding downward progress of the testis and the undeveloped right side of the scrotum as found in another patient.

doubt as to whether the patient was truly an example of abnormal position or simply one of the well-known cases in which the testis under the action of the cremaster muscle migrates readily from scrotum to inguinal canal. The further development of this work will be watched with interest. It is still, of course, not clear that in the process of stimulating growth by artificial methods we may not take on some other responsibility of which at the present time we are ignorant. There is, for instance, just a possibility that the stimulation of the testis on the other side to grow quite beyond its normal limits may at some future time prove objectionable. This method of treatment should not, however, be used in all instances, but only for certain age groups. It is obviously at its best when the young child is found to have on one or both sides an undescended or incompletely descended testis, and is still of an age when no permanent damage will result from the

abnormal position. This period appears to me to lie between the ages of three and seven. Children less than three can rarely be declared with certainty to be abnormal. Children more than seven may at any time begin to show the changes of puberty, and the process of replacement should, in my opinion, be complete if possible before the age at which these changes may begin even in unusual individuals. I suggest, therefore, that the most appropriate age group for the continued study of the effect of so-called "hormone" treatment will be between the ages of three and eight.

3. The third method at our disposal is that of operation. In order to be regarded as completely satisfactory and as having put the testis under the best possible conditions for development the following requirements may be laid down:

A. The re-position of the testis must be complete by the eighth or ninth year.

B. The testis must be placed in an entirely normal position at the bottom of the scrotum.

C. As time goes on the growth of the testis must be within what appears to be normal limits.

D. The operation must not subject the child to any considerable risk.

I have placed the time of election for operation between the fifth and ninth year, since it is clearly important that the testis should be in normal surroundings before the beginning of the changes of puberty.

The requirement to place the testis in a normal position involves the selection of the best method. The older methods of operation, of which the Bevan operation was for many years the type, do not seem to me to fulfill the requirements with sufficient certainty. It is true that in skilled hands the operation frequently gave excellent results. On the other hand, in a fair proportion of cases and in a larger proportion in the hands of less skilled operators, the final position of the testis was somewhat above that which can be regarded as normal. This is the outstanding weakness of the earlier types of operation and appears to me decisive. The Torek operation, first put forward by Torek in 1909,[15] fulfils the requirements in regard to position with much greater certainty. It is not technically more difficult than the older types, since the

key to both lies in very complete freeing of the abnormal fibrous bands about the vessels and the removal of all adhesions. In the earlier type of operation this freeing had to be if anything more complete and consequently made the operation more difficult. The advantage of the Torek method is that it continues for several weeks intermittent and reasonable traction upon the confining structures and stretches them slowly and safely. It is true that the Torek operation must be

FIG. 3. On the left is shown the position of the right testis some weeks after the first stage of a Torek operation on a patient with bilateral inguinal retention of the testes. On the right is shown the end result of the operation on the right testis and the first stage of the Torek operation on the left testis. (After Counseller.)

done in two stages, the first bringing the testis into a proper position and attaching it to the thigh on the same side, and the second detaching it from the thigh. Of these the first operation is not importantly more difficult to carry out than the earlier operations. The second step is literally a trivial operation requiring but a few days of hospital confinement (Figs. 3 and 4). The additional cost in confinement and disability seems to me to be well worth while in view of the results.

For a group of cases in which the testis is comparatively easily brought down to a proper position I have employed a method of making traction on the testis and scrotum for a period of about ten days after operation. This is carried out by attaching a catgut suture to the structures loosely referred to as the gubernaculum, bringing this out through the lowest point of the scrotum and attaching it by means of an elastic band to a crutch which bears upon the perineum (Fig. 5). By this device the amount of traction can be regulated, it need not be

continuous throughout the twenty-four hours, and at the end of about ten days when the catgut suture will, as a rule, give way, the relation of testis and scrotum has been very satisfactory. I do not suggest this as a substitute for the Torek operation in the more difficult cases, but only for those in which the earlier type of operation might have been successful, but in which we want much greater certainty of complete success.

The greatest difficulty will, of course, be met in the case of the testis retained within the abdomen. Under these circumstances the vessels are always shorter than when the testis occupies an inguinal or any of the other abnormal positions. The most careful dissection of the fibrous bands surrounding the cord will be necessary. Generally it will also be necessary to prolong the incision upward somewhat above the level of the internal inguinal ring so that the peritoneum may be retracted inward and the spermatic vessels freed from their retroperitoneal attachments to a considerably higher level. If done carefully, this procedure does not add to the danger of injuring the vessels and often makes the difference between the possibility of making the testis reach to a proper position in the scrotum, or being unable to do so. There has, however, in my hands been a small number of instances in which even after the most careful removal of fibrous tissue and freeing of the veins to the limit of what seemed to me safe, even after the freeing of the spermatic vessels from their retroperitoneal bed, it was still not possible to get the testis into a strictly normal position. For these cases in the past it has been our habit to leave the testis in a somewhat high position and let it go at that. In light of our knowledge derived from the work of Moore, this cannot now be regarded as satisfactory since it is inevitable that the abnormally high position will expose the testis to a higher temperature range and involve at least some failure of development. This will not do, and I think that we should consider for these cases a two or even a three stage operation. I have in a few cases been satisfied to leave the testis in the upper portion of the scrotum, holding it there by elastic traction. A year later the operation was repeated and the testis brought down satisfactorily. It has been suggested by Ada,[2] and I think wisely, that a three-stage operation might effect an even better result. This would involve bringing the testis to the lowest position which could be safely obtained and anch-

oring it there. The next step, which should not be undertaken for at least a year, would be to carry out the first stage of the Torek operation, to be followed finally by the third stage, being the second step of the Torek operation. This will not be required except in the more difficult cases, but to them it should be applied.

There are two other procedures which ought to be mentioned, namely, orchidectomy and abdominal replacement. I do not myself believe that orchidectomy is ever justifiable, since I remain unconvinced that by the appropriate use of the appropriate methods the testis cannot be brought down into

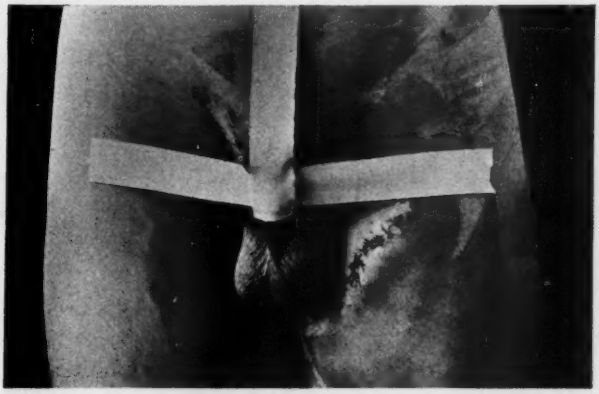

FIG. 4. This shows the end result of the Torek operation for bilateral inguinal retention of testes in a different patient from the one illustrated in Figure 3. (After Counseller.)

a reasonably satisfactory position. The only argument in favor of orchidectomy is that it avoids the risk of cancer. This is by no means negligible, but it must be balanced against the fact that even though the abnormally placed testis does not develop normally, it still retains its interstitial cells, and controls development and, I think, well being. If we remove such a testis and accident or disease should abolish the testis on the other side, then we have left our patient in an undesirable situation.

The operation of abdominal replacement does not seem to me wise. It has been done in those cases in which the testis was retained in a high position, and it was believed that it could not be satisfactorily brought down. The satisfactory

closure of the very commonly associated hernia can be most easily carried out if the testis is replaced in the abdomen and the inguinal canal obliterated. I do not like the procedure because it leaves the patient with an inaccessible testis. Should this testis at some later time become the site of cancer, then the disease is likely to progress far before its presence is suggested by symptoms. I believe it to be true that cancer developing in the testis retained within the abdomen is likely to be found more advanced at the time of its discovery than when the testis lies in an accessible position.

The question is often raised whether or not the testis of an adult should be treated by operation and what the operation should be. The best argument in favor of operation concerns itself with the risk of cancer. Operation puts the testis in a more accessible position in which abnormal changes can be discovered earlier and with greater certainty. A secondary argument, but one which has, I think, some validity, is based upon the psychic and emotional benefit to the patient. This will, of course, vary with different individuals. Finally, a good many adult patients will have a complicating hernia which must be dealt with and the re-position of the testis can be undertaken at the same time. These reasons taken together appear to me to warrant advising an adult, whose testis has undoubtedly undergone permanent although incomplete failure of development, to have it replaced in a normal position.

In connection with the recent advocacy of the hormone method of treatment the statistics of Burdick and Coley[4] have been referred to as showing satisfactory results in only 50 per cent of cases treated by operation. This is not a sound basis for an opinion and we are entitled to consider what results can be obtained by the application of the Torek or similar methods skillfully applied in a considerable group of cases. There have recently appeared two analyses of cases from The Mayo Clinic, one by Counseller in 1933,[6] and one by Walters and Thiessen[16] in 1935. These analyses show that in Counseller's series of fifteen cases good results were obtained in fourteen cases, or 93 per cent. In the series of Walters and Thiessen, of eighty-nine cases, good results were obtained in eighty-two cases, or 92.1 per cent. These results were not the work of one or two surgeons, but of several surgeons, and probably rep-

resent a fair estimate of results which may be expected in skilled hands. I think, therefore, that we may safely assume that satisfactory results can be obtained by operation in four cases out of five. Of course no operation will restore a permanently damaged testis. No operation will give satisfactory results in the atrophied morsels which one occasionally finds even in children. This is wholly beyond the field of surgery and it may perhaps lie in the field of hormone therapy.

No time need be spent in discussing the risk of the operation. In good hands that should be too small to weigh heavily

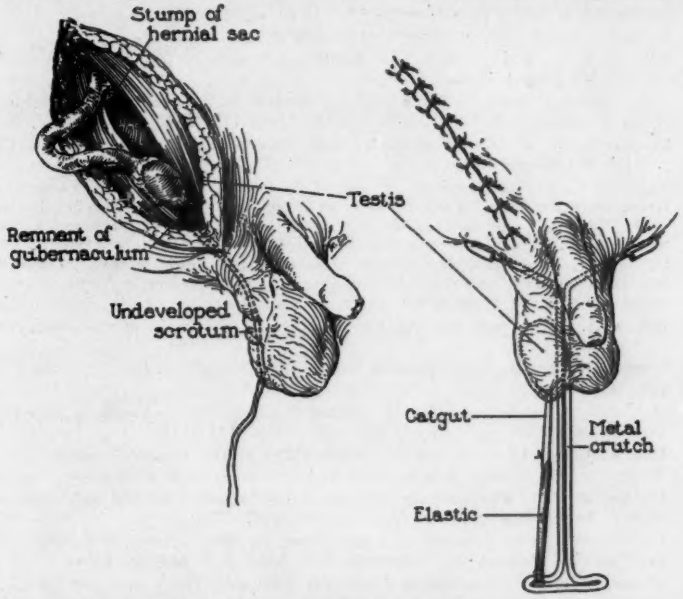

FIG. 5. This illustrates the technic of the author's method.

in the balance. It is true that an occasional testis will be lost by interference with the blood supply. An occasional testis may be lost by infection, but the proportion is very small and need not invalidate the soundness of the conclusions that operation is, in the present state of our knowledge, the most satisfactory method of treatment.

4. I do not wish to complete this discussion without referring to a method of treatment, the results of which have not yet been published, but in regard to which you will hear tomorrow from my friend, Dr. Edgar Ballenger.[3] He has de-

vised an extraordinarily ingenious method of applying suction in such a way that the confining structures are loosened up and the testis is brought into a normal position. Since he has not yet published his method or his results, it would be improper for me to refer to them except to say that I have seen some of his patients and that the results appear to me excellent.

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ENDOMETRIOSIS

A Clinical Study

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THE etiology of endometriosis has been one of the main battlegrounds of gynecologic research since 1921 when Sampson published the article which threw new light on a phase of pathology recognized as far back as 1860 by Rokitansky and further elucidated by von Recklinghausen and Cullen in 1896, Ivanoff in 1898, Robert Meyer in 1903, and by others in the gradually increasing army of investigators. It is interesting to trace the convergence of views expressed by the chief proponents of the theory at the present time. Novak absolutely opposed Sampson's theory of uterine backflow and championed the theory of metaplasia of the pelvic peritoneum, but now suggests that tubal secretion may play some part in the genesis of endometriomas, and Sampson admits the serosal metaplasia theory may be responsible for at least some manifestations of endometriosis. Novak concedes that in a few more years he and Sampson might very well write a joint paper on endometriosis, and it is now universally acknowledged that no one theory can explain all the lesions.

A clinical study of endometriosis will not, of course, solve the riddle of etiology, but it is informative to the clinician, and it was with this idea an analysis was made of 103 cases of endometriosis encountered in private practice at operation, in the gynecologic service of Dr. C. Jeff Miller at Touro Infirmary from Jan. 1, 1930, to June 30, 1935.

AGE

The youngest age in the series was 22 years, the oldest 62 years. Between the ages of 31 and 43, 61 of the patients, or 59.3 per cent, came to operation, the highest incidence being ten cases at 35 years of age.

From the Department of Gynecology, Tulane University of Louisiana and Touro Infirmary.

22	2
23-25	3
26-35	37
36-40	20
41-45	20
46-50	10
51-55	8
56-60	2
62	1
	103

The age of onset of menses showed wide variance, ranging from 9 to 17 years, the greatest number being at 13 years. Seven had passed the menopause:

Natural	4	(5-9 years before operation)
Radium	2	(2 years before operation)
Surgical	1	(12 years before operation)
	7	

Location of Endometriosis

Review of the microscopic reports on tissues removed at operation and, in a few cases where conservative technic was the procedure, of the pathology observed on exploration, revealed that the ovaries were the main site of endometrial transplants, without involvement of any other organ in thirty-six cases (34.9 per cent), and that in a further twenty-nine cases (28.1 per cent) the ovaries were implicated, together with the uterus, tubes, bladder wall, intestines, appendix, rectum, culdesac, and rectovaginal septum. Therefore, in sixty-five cases, or 63.3 per cent, there was endometriosis of the ovaries, and it is to be noted whenever the endometriosis was generalized, the ovary also was an offender.

	No. of Cases
Ovary	36
Ovary, and uterus	10
Ovary, and tube	5
Ovary, uterus, tubes, and culdesac	1
Ovary, uterus, tubes, and bladder	1
Ovary, uterus, sigmoid, rectum, bladder, appendix	1
Ovary, uterus, sigmoid, large bowel, ileum, appendix	1
Ovary, tubes, appendix	1
Ovary, tubes, ileum	1
Ovary, tubes, and throughout pelvis	1

Ovary, and ileum	1
Ovary, sigmoid, and rectum	1
Ovary, broad ligament, and rectal wall	1
Ovary, bladder, sigmoid and culdesac	1
Ovary, and rectovaginal septum	1
Ovary, and appendix	1
Ovary, and appendectomy scar	1
Tubes	12
Uterus	21
Uterus, and tubes	1
Cervix	1
Culdesac	2
Appendix	1
	103

An interesting sidelight is an addendum to the report of the pathologist on the tubes and ovaries of a patient operated upon in March, 1932: "There are some epithelial structures in certain areas which are more suggestive of misplaced *tubal epithelium than endometrium.*" Sampson's article on "Endometriosis and Tubal Fimbriae" was not published until October, 1932.

In two cases of endometrial rests in the culdesac there was no involvement of the ovary; although it is admitted that endometriosis may occur in the culdesac as primary lesions, it might be well to state that in neither of these cases was oophorectomy performed, supravaginal hysterectomy and appendectomy being the procedure in one instance, and suspension of the uterus and appendectomy in the other. In the latter, the endometriosis was the cause of adhesions in the culdesac and retrodisplacement of the uterus.

In one case, where the procedure was total hysterectomy with bilateral salpingo-oophorectomy, the only evidence of endometriosis noted by the laboratory was deep in the cervix with no involvement of the endocervix. In none were endometrial transplants visible in the vagina or around the cervix at vaginal examination prior to operation.

Fibroids

In twenty-six cases, the operative procedure precluded diagnosis by the laboratory of fibroids. The summary below gives the findings when hysterectomy or myomectomy was performed.

	Hysterectomy	Myomectomy	Total
Leiomyoma	43	3	46
Adenomyoma	4	0	4
Leiomyoma and Adenomyoma	4	1	5
	51	4	55 or 53.4%
No Myoma	22		

However, it is also true that even though the presence of fibroids might not have been diagnosed preoperatively, it would have been discovered upon operation, and this therefore is an accurate picture of the incidence of fibroids with endometriosis in this series of 103 cases.

Sterility

In any consideration of sterility in its relation to endometriosis the associated fibroid must also be borne in mind as a possible factor. In this series there were thirty-three patients who gave a history of no children and no miscarriages, and eight who had no children but who had had pregnancies ending in abortion, a total of forty-one sterile. Of this number, twenty-three had fibroids, or about 55 per cent.

Married		90
Fertile		49 or 54.4%
Children—No miscarriages or abortions	33	
Children—One or more miscarriage or abortions	16	
Sterile		41 or 45.6%
No children—No miscarriages	33	
No children—Pregnancies ending in abortion	8	
Single		13

What part the endometrial invasion played in the sterility of the 45.6 per cent of the 90 who were married is, of course, a matter for conjecture.

Previous Operations

Fifty-eight patients (56.3 per cent) reported previous operations, abdominal or vaginal. One only developed endometriosis of the scar from an appendectomy performed 23 years before. Fourteen had undergone salpingectomy, but it is, of course, debatable whether they exemplify Sampson's theory of endometriosis originating from the traumatized mucosa of the tubal stump.

Symptoms and Diagnosis

In analyzing the cases, with but a few exceptions, all presented more than one menstrual symptom with associated pelvic disturbances, which was surprising as it differed from the empiric picture of endometriosis as a disease making inroads on its host without any telltale signs of warning. In the first days of our knowledge of appendicitis, too, the now classic syndrome which enables the clinician to make a differential diagnosis and place the blame upon the guilty appendix was probably often ascribed to some other better known disorder. So few women have absolutely normal menstrual periods all their lives that the onset of painful menses, or an increase in flow with clotting, or other menstrual irregularities, backache, or even pelvic discomfort, is taken as something to be accepted as natural in the course of events. Such symptoms therefore are given no thought until they are exacerbated to the point of debilitating the patient, or the abdominal discomfort has progressed into acute attacks of pain. It is granted that all these symptoms, each and severally, may be laid at the door of other pelvic diseases, and that the variability in the symptoms makes it difficult. However, with increase in our knowledge of endometriosis, we shall more often and more early be able to differentiate in our diagnosis preoperatively.

SYMPTOMS

	No. of Cases
Menorrhagia	45
Metrorrhagia	29
Menorrhagia and Metrorrhagia	15
Dysmenorrhea	50
Leukorrhea	44
Amenorrhea	13
Postmenopausal Amenorrhea	7
Vicarious Menstruation	1
Dyspareunia	1
Abdominal pain	58
Bladder symptoms	40
Rectal symptoms	3
Backache	29
Headache	21
G. I. symptoms	25
Feeling of weight in pelvis	5
Nervousness	8

On the other hand, there were a few cases which were almost symptomless. In the youngest group, one patient in a menstrual life of only nine years had chocolate cysts of the ovaries, the uterus was retroverted and held back by adhesions caused by the endometriosis, and the tubes, ovaries, and culdesac were studded throughout with small endometrial implants. Onset of symptoms, in the form of dysmenorrhea, backache, and a continuous worn-out feeling, had occurred five years previous to operation, or in but the fifth year of the menstrual phase. Another patient, in the same menstrual span, presented endometriosis of the ovaries only, with dysmenorrhea and irregularity of periods, and fourteen hours preceding admission to the hospital, an attack of pain in the lower right quadrant accompanied by nausea and vomiting.

Dysmenorrhea was the most frequently complained of menstrual symptom, occurring in fifty instances, or 49.5 per cent, and was listed as one of the major complaints which brought the patient to operation in thirteen cases. The dysmenorrhea had persisted for several years in some cases, and in others, even among those in the middle age groups, was of only a few months' standing.

Any patient of middle menstrual life (the highest incidence of endometriosis in this series was between 31 and 43 years of age), who complains of pelvic pain during menstruation, progressively increasing in intensity, and who reveals an absence of infection upon examination, may very well be regarded as having endometrial implants until the reverse can be proved true. Pelvic pain was present either as the chief complaint or as an associated symptom in fifty-eight cases, or 56.3 per cent. The following shows the relation of the pain to the menses:

Not associated with menses	30
Before and after menses	4
Exaggerated by menses	4
During entire menstrual period	13
During first few days of period	4
At end of menstrual period	3
	58

Of course, the fact must be taken into consideration that along with the endometriosis in most instances there was also

some inflammatory process or other lesion of the pelvic organs, and in eighteen of the fifty-eight cases, chronic appendicitis.

Irregularity of menstruation, usually an increase in the amount and duration of the bleeding, is a frequent sign of endometriosis, and was manifest in forty-five cases (43.7 per cent). Of these there were fifteen who also had intermenstrual bleeding. Twenty-nine (28.1 per cent) had metrorrhagia without menorrhagia. However, too much reliance cannot be placed upon the menstrual disturbances as they often can be imputed to the co-existent fibroid.

Urinary symptoms are often present, bearing down sensation in the bladder, frequency, pain and burning on urination, etc., but endometriosis as the causative factor must be discounted until cystoscopy has been done. In this series, forty, or 38.8 per cent had bladder symptoms, and in a few instances the peritoneal surface of the bladder was involved in the endometriosis, but in none was there any endometriosis of the bladder lining.

Constipation and rectal tenesmus are frequently found. There is but rarely a history of bloody stools, and when there is it can often be attributed to hemorrhoids. One patient who gave a history of alternating normal flow from the vagina and hemorrhage from the rectum at time of menstrual period revealed no apparent disease of the sigmoid. When the sigmoid and rectovaginal septum are involved, rectal symptoms are pronounced, and accentuated just before and during menstruation.

Although nervousness does not appear to have a high incidence in this series, it is nevertheless a common finding, and is of the extreme type heightened by menstruation. Dyspareunia, too, although not so shown in the facts garnered from this analysis, has been a constant symptom.

Lumbosacral backache (28.2 per cent) is sometimes constant, but more often comes on just before the menses and persists two or three days after cessation of the flow, at times becoming excruciating.

In making a diagnosis from physical findings, frequently we find the uterus enlarged and retroverted, and lacking in mobility. Sensitivity of the uterosacral ligament prevails, and exudates are often present in the parametrial regions.

Treatment

When there is a possibility endometrial transplants are present, regardless of their location in the pelvis, and if there are associated fibroids of the uterus, radium should never be used for the relief of bleeding, if this diagnosis can be confirmed. Of course, the presence of intermittent pelvic pain would contraindicate the use of radium in fibroids. This symptom is so often overlooked because the fibroid is more obvious and the whole clinical picture is not taken into consideration. Surgery must be resorted to, if possible, and when the lesions are widespread, hysterectomy with bilateral oophorectomy should be performed. However, in many of these cases the adhesions are so dense, involving the bowel wall, that hysterectomy would be exceedingly dangerous, and should not be attempted when the adhesions have produced fixation in the culdesac. Bilateral oophorectomy should be employed as the endometriosis, after removal of the ovaries, will eventually regress, even though implants were found in this series nine and twelve years after the menopause. A further reason for which operation is preferred is the possibility of malignancy developing from the endometrial cysts. There were seven with carcinoma in this analysis, five of the uterus (two of which also had secondary carcinoma of the ovaries), and two of the cervix, hypothetically an outcome of endometriosis.

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SURGERY OF ARTHRITIS

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Memphis

ARTHRITIS is a complicated disease in which there are many phases of treatment, one of which is discussed on this occasion, and I desire to emphasize especially that no inference is made that local surgery to the affected parts can be regarded as a sole method of treatment.

In order to simplify this most confusing subject, arthritis may be divided into two great groups:

1. Those which begin very acutely and usually run a definite course, subsiding either with restoration and normal or slightly impaired function, or extensive destruction with marked impairment of function. This type is caused by some of the pyogenic organisms, such as staphylococcus, streptococcus, gonococcus and pneumococcus; one or more joints may be involved. Rarely the process may not run a definite course and become progressive, thus entering the second class. There is also another clinical entity that begins acutely and is polyarticular. This is "acute articular rheumatism," and becomes a low grade type more often than those of definite pyogenic origin.

2. Low grade affections comprise a large group with varying etiology and pathology, but all begin more or less insidiously. Those in this group which are of particular interest from a surgical standpoint, are low grade infectious arthritis, progressive polyarticular arthritis, also often called rheumatoid or the atrophic type of arthritis. Hypertrophic or osteo-arthritis and such conditions as gout, syphilis, endocrine disturbance, etc., while of this type, rarely require operative measures.

The restoration of the individual to normal or partial activity is often as essential in the relief of an individual with

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Illustrations are used from a paper by Dr. Campbell that appeared in a recent number of *Radiology*. The courtesy of its Editor and Publisher is gratefully acknowledged.

arthritis as any specific treatment for the case in question. Restoring to an individual the ability to walk results in a marked improvement in the physiology of the body and in the morale of the individual. Frequently this cannot be accomplished without surgery.

Operative measures employed in the treatment of arthritis may be described as follows:

Drainage in Acute Infections

Drainage in acute pyogenic infection of joints is indicated where the process is very virulent, as indicated by symptoms

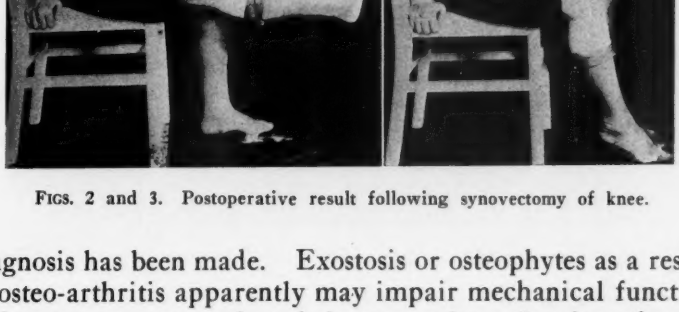
Fig. 1. Specimen removed from knee at synovectomy, showing hypertrophied synovial membrane and semilunar cartilage.

of severe sepsis. When advisable, the incision must be made at that point which will give the most efficient drainage of the joint. In the knee, as a rule two lateral incisions parallel with the patella are sufficient, but drainage of the posterior compartment may be required and consists of inner and outer incisions over the posterior aspect. Rarely drainage of the posterior compartment may be necessary through the posterior capsule in the midline. After drainage of a knee active motion every one or two hours, the so-called Wilhelm's method, may be of value in some instances. However, the method is more efficacious in gun shot wounds for which it was devised. The hip may be drained more effectively by the posterior method as described by Ober. Early drainage is more often required in the hip, as a large portion of the neck of the femur

is within the joint capsule and direct infection of the bone, or osteomyelitis, is imminent.

Excision of Pathologic Tissue

Obviously this is of value in loose bodies, enlarged villi, benign tumors, exostosis, and induration or fibrosis of the synovia. Loose bodies are formed most frequently as a result of osteochondritis dissecans, synovial osteochondromas or osteochondromatosis, and osteoarthritis or the hypertrophic type of arthritis. Enlarged villi rarely interfere to such a degree mechanically with function as to require removal. Benign tumors, as lipoma, fibroma and angioma, should be removed regardless of mechanical symptoms, as soon as the



Figs. 2 and 3. Postoperative result following synovectomy of knee.

diagnosis has been made. Exostosis or osteophytes as a result of osteo-arthritis apparently may impair mechanical function and cause symptoms, but their removal rarely gives the desired relief. The operative procedure for these conditions is a very simple measure in the superficial joints, as the elbow, knee and ankle, but is somewhat more complicated in the hip. In loose bodies, enlarged villi and benign tumors the results as a rule are excellent, as the etiologic factor is excised. In low grade infections, traumatic arthritis, osteo-arthritis and osteochondromatosis the synovial membrane may be indurated with enlarged villi, thickening of the capsule, and persistent fluid distending the joint, which may be resistant to every form of conservative treatment. In such a case much benefit may be secured by an operation which consists of excision of the synovial membrane, and is known as synovectomy. The operation is employed most frequently in the knee. A medial

incision is made parallel with the quadriceps, patella, and patella tendon into the joint. The entire synovia is dissected from above downward with the semilunar cartilages and removed from the joint. The joint is then closed in routine manner and active and passive motion instituted on the tenth day. In monarticular affections excellent results usually are secured in a condition not amenable to any other form of treatment. Synovectomy also is frequently employed when the process is polyarticular. At times foci of infection are removed in this manner and the general process arrested. However, the results are by no means as satisfactory as in

FIGS. 4 and 5. Postoperative result following bilateral posterior capsulotomy.

monarticular affections. Synovectomy absolutely refutes the old adage that the "loss of joint fluid or oil induces ankylosis." In fact, not only is the fluid lost, but the means by which the fluid is formed. However, after this operation a new synovial membrane is reproduced by nature, which secretes normal joint fluid.

BRISEMENT FORCE

The employment of excessive force under anesthesia is very rarely indicated in the treatment of injuries and diseases of joints. Severe and irreparable damage, as crushing of articular surfaces, tearing of the articular structures, severe traumatic fractures and relighting of virulent infection often occur. Function in a joint usually can be cultivated gradually to better advantage when it is not forced. If adhesions

are so strong as to require excessive force, open operative measures are indicated.

Plastic Procedures

Plastic procedures for the elongation of extra-articular contractures are indicated where there is no involvement of the joint, and fibrosis of these structures has progressed to such

Figs. 6 and 7. Flexion contracture of knee, preoperative and postoperative.

a degree that restoration to the most serviceable position cannot be secured by the conservative measures described above. Operative measures for this purpose have improved materially during the past twenty years. Formerly blind tenotomies, fasciotomies and osteotomies were employed, in which the function of important structures was impaired by severance and filling in of the space gained thereby with dense scar. This often later contracted, with more or less recur-

rence of the deformity. We now employ well-planned open operations in which the contractures can be elongated with conservation of normal tissue and reduction of healing by scar tissue to a minimum. These measures can be illustrated

FIG. 8. Progressive polyarticular arthritis.

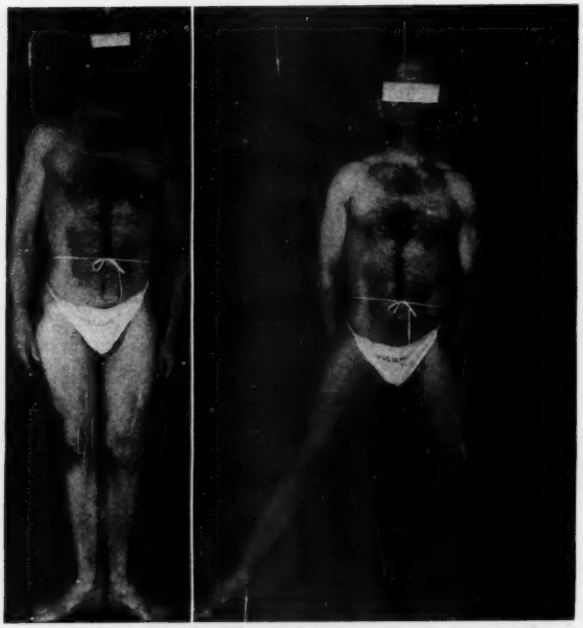
by certain operations. When there is extensive flexion contracture of the elbow, motion may be possible only from a right angle to complete flexion. In order to secure extension anterior capsulotomy is accomplished by a medial approach; the median nerve and vessels are isolated and retracted outward and forward, and the entire capsule is resected, which always consists of dense scar tissue. Often this will permit complete extension. Otherwise, a lateral incision is made and the biceps and brachialis anticus are elongated by the Z-shaped plastic method. In flexion contracture of the knee by a similar procedure the posterior capsule is severed, scar tissue resected, and, if necessary, hamstring tendons elon-

gated. If external rotation of the leg is present, the biceps is also elongated. This measure has almost completely replaced the supracondylar osteotomy, which caused deformity of more or less degree resembling a golf stick, and did not permit the return of the full range of motion. When the knee is fixed in complete extension by contraction of the anterior structures, elongation of the quadriceps muscles is se-

FIG. 9. Postoperative result following arthroplasty of both hips.

cured, which will permit full flexion. If the hip be extremely flexed in abduction or adduction, the operation described by me as transference of the crest of the ilium may be employed. This consists of exposure of the hip by a long anterior incision. The gluteal muscles attached to the crest or dorsum of the ilium are severed at their attachment and the capsule of the hip is incised by a Z-plastic incision so as to conserve the Y ligament. This will permit the limb to be extended. If the adductors are contracted, they may be severed at their insertion by a subcutaneous tenotomy. This will permit the hip to be placed in the desired position and the muscles to be reattached at a lower level. All structures are thus conserved with normal nerve and blood supply, which have in no manner been impaired. The results are excellent and a

functional range of motion is secured. In some instances there is a normal range of motion. When both hips or knees are involved, the individual is chair ridden, but after a series of operations as above described can often be enabled to walk. The very act of walking is an important agent in improving the morale as well as the resistance of the individual to combat the causative agent.



FIGS. 10 and 11. Same patient as shown in Fig. 9, showing motion present after arthroplasty of both hips.

REDUCTION OF DISLOCATIONS

Unless obtained very early, reduction of dislocations can only be accomplished by an open operation, as the adhesions are much stronger than the bone, which is always atrophic. Unless observed within one or two weeks after dislocation, reduction is practically always followed by ankylosis. The articular cartilage of the entire articulation undergoes rapid fibrillation and aseptic necrosis for the joint fluid which acts both to nourish and to lubricate is lost.

Removal of Mechanical Intra-Articular Obstruction

The removal of mechanical intra-articular obstruction, usually caused by scar tissue, rarely by bone, is at times indicated, but more often is employed in conjunction with other measures described above and below.

Arthrodesis

Fusion or arthrodesis is an operative procedure for the purpose of inducing osseous ankylosis, and usually is indicated

Fig. 12. Same patient as shown in Fig. 9, showing motion present after arthroplasty of left knee.

for the purpose of relieving pain in a joint in which the destructive changes are so advanced that restoration to a practical degree of painless function is impossible. The operation may be indicated in any joint but is employed more frequently in the hip joint. A wide exposure is made with complete denudation of the head and acetabulum. In addition the greater trochanter with muscle attachments is transferred

across the joint and multiple flaps of cavernous bone are turned down from the ilium. The procedure is commonly used in monarticular affections, as in osteoarthritis, or so called coxum malum, and in the residual stage after any destructive process has caused an irregular or incongruous articulation. In progressive polyarthritis, rheumatoid arthritis, or atrophic type of "arthritis deformans," one hip joint may cause such extensive disability from destructive changes with excessive pain

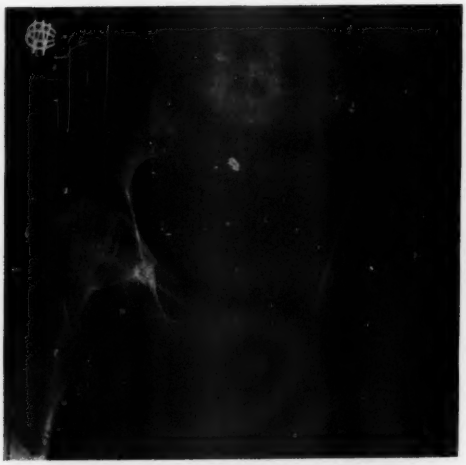


FIG. 13. Ankylosis of both hips due to progressive polyarticular arthritis.

that the individual may be unable to walk. In such cases the evolutionary process may require years before there is a relief of pain from osseous ankylosis. Therefore, I have employed fusion in some instances with arrest of the local process. This has enabled the patient to return to a more normal life and is a valuable adjunct to any form of treatment.

RECONSTRUCTION

The so-called reconstruction operation is employed in monarticular affections of the hip joint. The operation was devised for ununited fracture of the neck of the femur and consists in the excision of the head, detachment of the trochanter and the placing of the upper extremity of the femur into the acetabulum, after which the trochanter is attached to the

femur at a lower level. A movable joint is thus secured, but it is not comparable to the normal joint, as there may be more or less pain and disability. Fusion gives more certain relief but many decline to submit to an ankylosed hip.

ARTHROPLASTY

Arthroplasty is the restoration by surgery of motion in a joint when there is complete ankylosis. The operation con-

FIG. 14. Same patient as shown in Fig. 13, after arthroplasty of both hips.

sists of remodeling the articular surfaces, after which some material is interposed for the purpose of inducing free motion and preventing recurrence. For this purpose a free transplant of fascia lata is employed most frequently. This procedure may be employed when there is multiple ankylosis but is indicated more frequently in monarticular ankylosis as a result of acute pyogenic infection after the process has entirely subsided and has reached the residual stage. Distinction must be made between an arthroplasty and excision or such measures as reconstruction. In arthroplasty there must be due regard to all of the component parts of the joint, as muscles, ligaments, blood vessels, nerves, etc., if function is to be restored. Arthroplasty is not merely the removal of an area of bone for the purpose of inducing pseudo-arthrosis.

At best a joint reconstructed by arthroplasty does not approach the normal, but an excellent, durable and efficient joint may be restored. Anatomic restoration is not always possible or feasible. In the knee and elbow the construction of a simple hinge joint will be an excellent substitute. The reproduction of the normal spine and the intercondylar notch with condyles

FIG. 15. Ankylosis of hip following monarticular arthritis.

and tuberosities will not function as a normal knee as there are no crucial ligaments. The circulation is not sufficient to sustain the anatomic contour which becomes modified in time by aseptic necrosis and absorption. Therefore, in 1918 I began to reproduce a different type of joint which consisted of making one convex condyle of the femur, one shallow concave surface on the upper extremity of the tibia, and removal of as much of the posterior portion of the patella as was consistent with tensile strength. This restored a much simpler hinge joint which gave practical function in a much higher

percentage of cases than I had been able to attain by conforming strictly to anatomic contour.

Arthroplasty is of particular value in the jaw, elbow, hip and knee. These are the joints in which there is the greatest disability following ankylosis. In monarticular ankylosis a high percentage of restoration of function is secured. The

FIG. 16. Same patient as shown in Fig. 15, after arthroplasty.

results in multiple ankylosis and in those with progressive ankylosing arthritis are far from satisfactory, but as the condition is so disabling and hopeless any effort that offers the slightest chance of relief is worthy of trial. In polyarticular ankylosis there is much difficulty in securing the necessary after-treatment essential to the physiologic reconstruction of the new articulation on account of the inability of the patient to cooperate in exercising the new joint. An analysis of the end results has been previously published, to which reference can be made.

The type of articulation reconstructed has been clearly demonstrated by the examination of specimens from joints in which motion has been secured by arthroplasty. For example, in a knee one year after operation there was a definite joint cavity about one-half the size of a normal joint with joint fluid. The surface was covered with a fibrous membrane closely resembling the fascia lata which had been interposed

FIG. 17. Ankylosis of knee following monarticular infectious arthritis.

at operation. The microscope demonstrated from within out a layer of fibrous tissue, fibrocartilage and cavernous bone. The fibrocartilage was invading the sub-articular, intra-osseous spaces. In those that were examined after two or more years the fibrous layer was substituted by fibrocartilage, but in no instance resembled normal hyaline cartilage. The same type of joint that is secured after arthroplasty has been demonstrated after complete destruction of an articulation from many causes and must be regarded as nature's substitute for a normal joint.

Sympathectomy

Cervical or lumbar sympathectomy or the resection of the sympathetic ganglion has been employed so as to produce vasomotion dilation with elevation of the local temperature. This procedure is more in the province of neurologic surgery and has not as yet been employed sufficiently to determine its true value.

Figs. 18 and 19. Same patient as shown in Fig. 17, after arthroplasty of knee.

Selection of Procedures

Two or more of the above procedures may obviously be combined, for example, arthroplasty and plastic procedures for the elongation of extra-articular contractures.

The selection of the procedure to be employed depends largely upon the structure and relation of the bones comprising the articulation, as demonstrated by the roentgenogram, and also the etiologic factor of the pathologic process. There

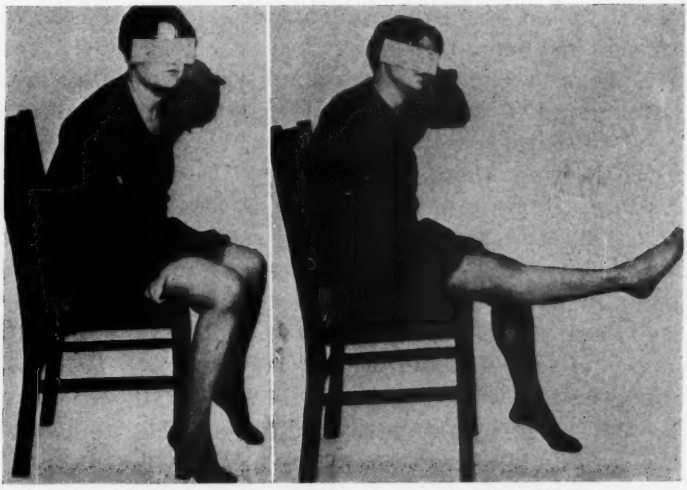
may be extensive bone atrophy, more or less loss in continuity, sub-articular cysts and cavities, sequestra, and extensive hypertrophy or condensation which may obscure cysts, cavities or sequestra. When there is osteoporosis, bone structure should be restored to as near normal as possible before operative measures are employed. This can be accomplished by active use unless gross deformity prevents; then correction of deformity is required as a preliminary step which will permit active use of the part. In some instances the desired operation may be carried out after which the return of normal bone structure is gradually induced by apparatus that permits only partial active use, as weight bearing. If there is extensive loss in continuity, the reconstruction of any type of articulation that will permit function may be impossible, and such measures as osteotomy or fusion are usually indicated. When such articular cysts or cavities are present, a new base for an articulation often cannot be reformed, thus restoration of function may be impossible. In such cases if no symptoms are present and the part is in the most serviceable position, no treatment is indicated. But if painful symptoms or malposition are present, operative measures are indicated. Sequestra and cavities visible to the roentgenogram through dense bone are frequently potential foci of dormant infection which may be relighted by operation. Also pus cavities in the soft tissues and those entirely obscured by condensation and hypertrophy not demonstrable by the roentgenogram, may be found at operation when not suspected.

Diagnosis

Joints often react to different etiologic factors in a very similar manner. Therefore, differentation by the roentgenogram may be difficult or impossible, but it is usually suggestive, if not conclusive; as in bone tumors, that diagnosis is not made by any one element, but may require an accurate history, roentgenogram and biopsy. Often the history is obscure and we must depend almost entirely upon the manifestations as demonstrated by the roentgenogram.

In ankylosis resulting from intra-articular pyogenic infection the manifestations in bone are confined to the articular surface and to the sub-adjacent bone for a short distance only.

In fibrous ankylosis there is more or less condensation of the extremities of the bone which stand out in marked contrast to the structure of other bones of the extremity, or of the joint of the normal side; the joint line is visible though narrow. Osseous ankylosis presents the same appearance though exaggerated, and there is no visible joint line after the lapse of one year. By functional adaptation the marrow cavity after several years may encroach upon the joint so as to form



FIGS. 20 and 21. Motion present after arthroplasty of the knee.

a central canal connecting adjacent bone. When this occurs the success of reconstruction operations is more doubtful as there has been coincident functional atrophy of the muscles and function cannot be easily restored. Also foundation for a new articulation is not always available.

In ankylosis as a result of extensive osteomyelitis the causative agent is usually the same as in pyogenic infection but the structure for a considerable distance is of dense eburnated bone which bears the same relation to normal bone as dense scar tissue does to normal soft tissue. The circulation is deficient and the quality of such bone is poor. Also such tissue is less resistant to infection or, if infection is dormant, it may be relighted by any surgical procedure; therefore, reconstruc-

tion operations for the restoring of function are positively contraindicated.

In attenuated pyogenic infections there are destructive changes with condensation and erosion of the articular surfaces. The joint line is plainly visible, the sub-adjacent bone is normal and some motion is present. In this type operative reconstruction gives very favorable results.

In osteo-arthritis or the hypertrophic type of arthritis, and in atrophic, rheumatoid or progressive polyarticular ankylosing arthritis, the manifestations are characteristic and well known and require no discussion.

In syphilis there is increased density, hypertrophy of the periosteum and cortex, and definite punched out areas of the articular surfaces, but differentiation can frequently be made by the Wassermann test.

The tuberculous joint is not under discussion, but as reconstructive surgery is usually contraindicated when tuberculosis is the causative factor, differentiation is very necessary. In uncontaminated tuberculous joints osseous ankylosis is very rare. There is usually a definite joint space with erosion, and at times destructive areas beneath the surface. Atrophy is more extensive in tuberculous joints. Therefore the bones comprising the articulation are relatively much smaller than those of the opposite side when compared with other affections. In tuberculous joints which have been contaminated with pyogenic organisms differentiation may be impossible, as the characteristic reaction of such infections may completely obscure the tuberculous process. However, there are usually some of the characteristics of a tuberculous lesion and a pyogenic infection associated, as described above.

In most instances in the residual stage of arthritis the diagnosis by the roentgenogram alone is not required, as physical signs and past history are valuable evidence and if combined with the lesions as demonstrated by the roentgenogram, an accurate diagnosis is usually possible.

In all types of arthritis there is a material danger of deformity, which in many instances causes total disability, and can be prevented by efficient apparatus that will permit walking. Also deformity in the early stage can be corrected by simple measures described above.

SUMMARY

During the past decade much progress has been made in the treatment of arthritis due to the increased interest in the subject and intensive study by the general profession. The increasing number of good end-results is not due to any specific new remedy but to efficient administration of well-known methods. Arthritis is not in the province of orthopedic surgery alone but requires the close cooperation of all specialists if success is to be attained.

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STANDARDIZATION

THE genus homo still clings to the herd instinct of following the leader. Even in matters intellectual there is often a demonstration of what may be called mob psychology. If the leader is good and wise the standard he establishes is good and wise, but if the leader is bad or foolish it is just too bad. To speak of standardization is to acknowledge the finite: that is, that the particular procedure proposed for standardization has reached the ultimate of perfection. This is contrary to human experience. Standardization marks the end of freedom and the beginning of intellectual serfdom. China is an example of mass standardization of human thought and activity and demonstrates what hindrance to progress it can be. Her revolution is an effort to throw off the yoke of standardization.

The building of places of abode is no doubt one of man's oldest accomplishments. Now who would dare suggest that the details of building a house should be standardized? Yet there are people who talk of standardized operations, standardized hospitals. What they mean is that their standard is that of some outstanding man or institution and that every other procedure or institution is substandard and therefore

should not exist. Many of the practices of today will soon become obsolete. This is inevitable unless we fail to advance in knowledge.

The average man of the medical profession in America today stands second to none. Why? Because we have been untrammeled by tradition and standardization. We have been freemen and have worked out our problems in our own ways. The present tendency is un-American, and it is time to call a halt before our yokes become too heavy to cast off. To be sure, it is necessary that we have agencies for comparing and commenting on all professional and hospital activities of the United States, and qualifications for recognition are essential. But let us keep in mind always the proper care of the sick and injured. The doctor or hospital who can do this well should have recognition. No other qualification should be necessary. The number of interns, the number of supervisors, heads of departments, etc., should not enter into consideration. A clinic or hospital can have all of these and care for the sick and injured in a very indifferent manner. Not only should the ability to care for these unfortunates properly be a prime consideration, but also the willingness to do so.

Let us pledge ourselves anew to obtain knowledge from whatever source available, view all innovations with scientific interest, and practice them with caution.

J. S. TURBERVILLE, M. D.

CONTRIBUTIONS

Particularly now that THE SOUTHERN SURGEON is being published every second month, there is room for many papers that have not been read before the Assembly of The Southeastern Surgical Congress. Papers from surgeons living north of the old Mason and Dixon or west of the Rockies will, as always, be welcomed and whatever fame the author may have already achieved will not be held against him. However, the particular ambition of the SURGEON is to secure for publication good original papers that will build up reputations for young men of the South.

BOOK REVIEWS

The Editors of THE SOUTHERN SURGEON *will at all times welcome new books in the field of surgery and will acknowledge their receipt in these pages. The Editors do not, however, agree to review all books that have been submitted without solicitation.*

THE MEDICINE-MAN OF THE AMERICAN INDIAN AND HIS CULTURAL BACKGROUND. By WILLIAM THOMAS CORLETT, M. D., L. R. C. P., Lond., Professor Emeritus of Dermatology-Syphilology, Western Reserve University: Fellow of the Royal Society of Medicine of Great Britain; Honorary Member and sometime President of the American Dermatological Association; Corresponding Member of The British Association of Dermatology and Syphilology, etc. 369 pages with 24 illustrations. Price, $5. Springfield and Baltimore: Charles C Thomas, 1935.

Dr. Corlett's interest in the Indian dates from his boyhood when the war-cry had hardly ceased to echo around his home and he could pick up arrowheads from the fresh furrows. In addition to wide study, he has conversed with the rapidly dying out medicine man. He gives one a fresh conception of the Indian—as different from Cooper's Noble Redskin as from the more common one of a treacherous sadist. He emphasizes the wide differences between the tribes of New York and the South, between the Prairie Indians and those of the Southwest, between those of Mexico and Peru and those of the Amazon jungles. He classifies the Eskimos as Indians and tells of them and of the very primitive aborigines of the extreme southern tip of South America. He has sketched their customs, their religions, their pharmacology. He has covered wide territory. The charge of superficiality may be refuted with the charm of brevity.

The book is not too scientific for the laity. It is therefore recommended to all who are interested in the earlier inhabitants of this hemisphere.

THE BRAIN AS AN ORGAN: ITS POSTMORTEM STUDY AND INTERPRETATION. By FREDERIC WERTHAM, M. D., Assistant Professor of Psychiatry. New York University-Bellevue Hospital Medical College, and FLORENCE WERTHAM. With an introduction by ADOLPH MEYER, M. D., Psychiatrist-in-Chief, Johns Hopkins Hospital. Price, $7.50. New York: The Macmillan Company, 1934.

This book is of chief interest to neurologists, neuropathologists and neurosurgeons, but it should be studied by all general pathologists. The first two chapters are devoted to methods of gross and microscopic study of the brain, with many valuable suggestions for avoiding errors and for obtaining good results. Successive chapters deal with the kinds of lesions found in the brain and their distribution. This leads up to the most valuable portion of the book, consisting of a discussion of the extent of changes found in the normal, the interpretation of the various types of lesions, and the correlation of lesions with various mental disorders. The final chapter deals with medico-legal considerations.

This book focuses attention on the wide gaps in our knowledge of the relation between lesions and symptoms in nervous diseases. A plea is made for the study of the brain in non-nervous diseases, in order to establish a control series of cases, from which a proper interpretation of lesions can be developed. It is to be hoped that general pathologists will develop an interest in this subject, and that neuropathologists will consider the brain "as an organ" of the body and not something separate and apart from the rest of the organism. This book is highly valuable from the standpoint of orientation as to the evaluation of present pathologic methods and the meaning of pathologic lesions in the brain. —W. A. SMITH, M. D.

A BIBLIOGRAPHY OF THE POEM SYPHILIS SIVE MORBUS GALLICUS BY GIROLAMO FRACASTORO OF VERONA. By LEONA BAUMGARTNER and JOHN F. FULTON. Pp. 157 with 9 illustrations. Price, $5. New Haven: Yale University Press, 1935.

Heart disease, as is only too well known, kills more adults than the next three leading causes of death. It is particularly apt to attack physicians, apparently because of the heavy responsibilities they bear, the unceasing strain under which they live. For no class of men in these strenuous days then is it more necessary to cultivate a hobby: certainly every doctor should have at least one. Golf is no mean hobby, neither is any other form of outdoor sport, nor tinkering in one's own little carpenter shop. But there may come a time when he needs a hobby that does not require physical exertion. Against that dread day an appropriate avocation is the study, if not the collection, of incunabula and old books. No better start could be made in this direction than the acquisition of the book under consideration.

This bibliography is gotten up with exquisite care and its typography makes it a work of art.

THE AUTONOMIC NERVOUS SYSTEM: ANATOMY, PHYSIOLOGY AND SURGICAL TREATMENT. By JAMES C. WHITE, M. D., Assistant Professor and Tutor in Surgery, Harvard Medical School; Assistant Visiting Surgeon, Massachusetts General Hospital. 366 pages with 96 illustrations. Price, $7. New York: The Macmillan Company, 1935.

Early in the twentieth century surgery was advancing rapidly with the perfection of surgical technic, asepsis and anesthesia: it seemed that soon the surgeon would find himself like Alexander weeping for fresh worlds to conquer. Then, for a time during the boom days it seemed that such advances as were made in surgery were really effected by the medical brethren. Perhaps the surgeon was a bit impressed with his own importance, perhaps he was too busy watching his stocks climb higher and ever higher. With this exhilarating pastime in the limbo of those dear days beyond recall, came a rapprochement between surgeon and internist. There was further investigation of the basic sciences, notably of anatomy and physiology. We learned that Vesalius' great De Fabrica did not contain the last word in anatomy and that even Claude Bernard had left some things for those that came after to discover.

In no fields has more brilliant research been done than in that of the autonomic nervous system. In passing, the first great surgical adventure in this field, Jonnesco's attempts to relieve the pain of angina pectoris, now seems to stand out only as an historic landmark: even the ardent author of this book yields that at this time total thyroidectomy is the method of choice in severe cases that do not yield to less radical measures. A similar conclusion was reached by a contributor to the last issue of the SURGEON.

It is encouraging that in the field of neurology at least, young men are writing books: Grinker, of Chicago, Livingston, of Oregon, and now White, of Boston.

Dr. White writes with the enthusiasm of youth, with the surety of knowledge, but with the sound clinical conservatism to be expected of a Bostonian. The book is recommended unreservedly as a beautiful exposition of the present knowledge of the autonomic nervous system, and of what may be expected at this time from surgical attempts to correct its disorders.

A TEXT-BOOK OF FRACTURES AND DISLOCATIONS, COVERING THEIR PATHOLOGY, DIAGNOSIS AND TREATMENT. By KELLOGG SPEED, S. B., M. D., F. A. C. S. Professor of Clinical Surgery, Rush Medical College of the University of Chicago; Attending Surgeon, Presbyterian Hospital; Formerly Attending Surgeon, Cook County Hospital, Chicago, Illinois, etc. Third edition, thoroughly revised. 1,000 pages with 1,042 illustrations. Price, $11. Philadelphia: Lea and Febiger, 1935.

It is a pleasure to welcome the third edition of Speed's Fractures and Dislocations. The author's common sense, his insistence on "Splint 'em where they lie" and "It is the doctor behind the splint and not the splint that counts in the treatment of fractures," and the extensive use of line drawings traced from x-rays are the outstanding features of the work.

The surgeon of 50 years ago, who unquestionably did often get excellent results in his treatment of fractures, but who thought it just too bad if he didn't, would be surprised to know of the improvements in this line since x-ray guidance has been added, and would be surprised to learn of other more recent improvements in handling fractures. He would also be surprised to learn of the increased frequency of fractures in this age of industrialism and of high-powered death-dealing gadgets, so often under the control of alcoholized nincompoops. However, the old-time surgeon could rapidly catch up with the march of time by means of this new book.

CLINICAL DIAGNOSIS BY LABORATORY METHODS. By JAMES CAMPBELL TODD, Ph. B., M. D., Late Professor of Clinical Pathology, University of Colorado, School of Medicine; and ARTHUR HAWLEY SANFORD, A. M., M. D., Professor of Clinical Pathology, University of Minnesota (The Mayo Foundation); Head of Section on Clinical Laboratories, Mayo Clinic. Eighth Edition, Thoroughly Revised. 792 pages with 370 illustrations, 29 in colors. Price, $6. Philadelphia and London: W. B. Saunders Company, 1935.

The new edition of Todd and Sanford has been brought up to date in every way but nothing has been changed merely for the sake of changing.

Screw-worm infestation and the black widow spider are among the many new sections. The sensible general arrangement, the clear instructions, the extraordinary completeness that were introduced by Professor Todd in 1908 still characterize the book and make it an excellent text. The extensive clinical experience of Sanford and of his colleagues of the laboratories of the Mayo Clinic adds greatly to its practical value. The practicing surgeon will never need to know how to prepare the reagents used in the Wassermann test, it is true, but it is surely important for him both that these reagents should be properly prepared and that they should be properly employed in the study of his patients. He may also profit at times by looking up in this book the significance of various laboratory procedures of recent vintage.

A Synopsis of Regional Anatomy. By T. B. Johnston, M. D., Ch. B. Professor of Anatomy, University of London, Guy's Hospital Medical School. Third Edition. 460 pages with 11 illustrations. Price, $4.50. Philadelphia: Lea & Febiger, 1935.

This book should prove valuable to the undergraduate, to the young physician preparing for the State Board examination and to the teacher of anatomy and surgery.

The American Illustrated Medical Dictionary. A Complete Dictionary of the terms used in Medicine, Surgery and Dentistry, Pharmacy, Chemistry, Nursing, Veterinary Science, Biology, Medical Biography, etc. By W. A. Newman Dorland, A. M., M. D., F. A. C. S., Lt. Col. M. R. C., U. S. A.; Member of the Committee on Nomenclature and Classification of Diseases of the American Medical Association. With the collaboration of E. C. L. Miller, M. D., Medical College of Virginia. Seventeenth Edition, Revised and Enlarged. 1,573 pages with 945 illustrations, including 283 portraits. Price, $7. Philadelphia and London: W. B. Saunders Company, 1935.

Dorland's medical dictionary is well known to the profession. It is quite indispensable to the boy or girl beginning the study of medicine. When one has been out of school a few years of course he understands most of the words he encounters every day, and he does not need it so constantly. But, whatever may have been the case a half century ago, no finite mind can keep track of all the multitudinous words that are coined today. What graduate of 1915, for example, would recognize in *eberthella* our old friend the typhoid bacillus? Nor can any mind keep ever on tap the innumerable minutiae of anatomy, dosage and such like. The new edition of this dictionary is therefore commended highly to all as an extraordinary repository of both time-tested and the very latest knowledge. It provides you in a few seconds with a clear definition of the new terms, as well as tables and diagrams of all the things you have forgotten.

The book is also of cultural value. Among other things one may note that there is no authorization for the pronunciation *ab*domen, and that digi*tay*lis seems unnecessary. The numerous portraits of medical celebrities add interest, even though through a ghastly oversight William Beaumont was left out.

FELLOWSHIP FUND RENEWED AT YALE

The Davis & Geck Fellowship Fund, which was established in 1930 for experimental work in surgery at Yale University School of Medicine, has been renewed for another period of five years, according to an announcement from the secretary at New Haven on September 12. The administration of this Fund is under the Department of Surgery which selects the graduate students for assignment as Davis & Geck Fellows.

During the past five years there has been published a number of papers embodying results of these research studies. The subjects of these articles have included healing of wounds as determined by their tensile strength; velocity of growth of fibroblasts in the healing wound; factors determining the loss of strength of catgut when embedded in tissue; breaking strength of healing fractures; effect of high protein diet on the velocity of growth of fibroblasts in the healing wound; influence of a diet rich in casein on the strength of bone and the healing of fractures; age factor in the velocity of growth of fibroblasts in the healing wound; strength of the healing wound in relation to the holding strength of catgut sutures; phosphatase content of fractured bone; effect of complete and partial starvation on rate of fibroplasia in the healing wound; histology of healing fractures in rats on normal diets and on diets low in total salts, calcium, and phosphorus; effect of standard diet and of high fat, high carbohydrate, and low calcium diets on the breaking strength of healing fractured fibulae of rats; tissue response to catgut absorption, silk and wound healing; reaction to injury as a function of growth; influence of bilateral ovariectomy on breaking strength of healing fractured fibulae. Several other similar studies are in progress.